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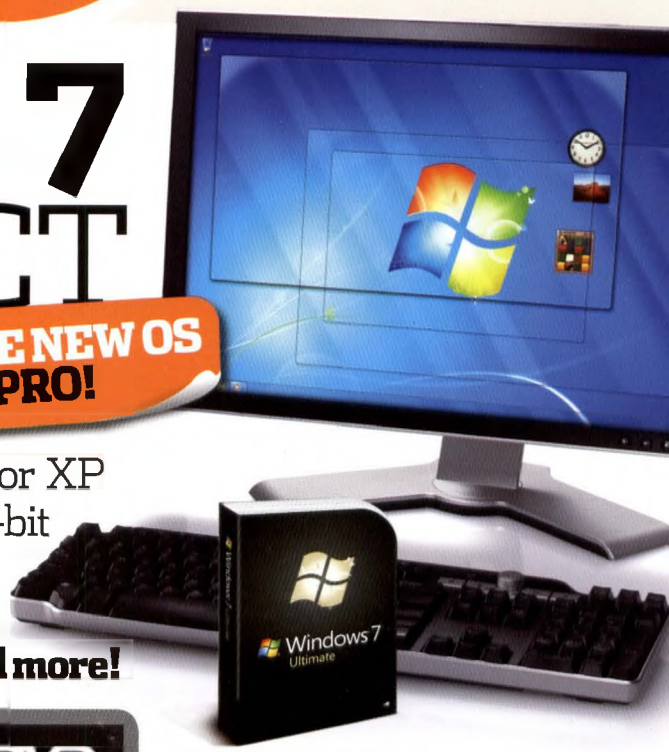

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- Vuze 4.2.0.2 for Mac OS X and Windows
- XviD 1.2.2
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ANDROID

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06 editorial

TONY SARNO

VISTA FAILED TO CONTINUE THE TRADITION AND WITH HINDSIGHT, WILL BE REGARDED AS A PRACTISE RUN FOR WINDOWS 7.

Welcome to our special Windows *7* issue of *APC*. A major new Windows OS is a massive event and we've made sure our coverage reflects this. Some regular features , such as Best Tech and Best Builds, will return next month.

For me, the Windows story goes back a long way. Somewhere in my garage is a copy of Windows 386, in its original packaging. This was the first version of the OS that I got my hands on, actually a variant of Windows 2.1. Looking back on it now, it had the quality of alpha software and came on about 50 floppy diskettes. If you think installing an OS takes a long time now, try doing it back in the mid 80s, when every tenth diskette also failed to work.

Then came the first successful Windows, 3.0. At the time I was so used to the command line paradigm of DOS that when I first installed Windows 3.0 I got so hopelessly lost in the maze of open windows that I decided to reinstall the program and start again! The new OS was really a quantum leap from a linear, monochrome universe to one with primary colours and different things going on in different places on the screen, and it confounded many command line disciples, many of whom swore they would never migrate.

Next came 3.1, a massive improvement that was akin to a Service Pack 1 & 2 double whammy and resulted in a massive drop in blue screens of death from one or two a day to maybe one a week. Windows 3.11 for Workgroups introduced networking to the OS and is underrated in computer histories. Then came Windows 95, the first truly solid, stable Microsoft OS. Windows XP improved on it and was responsible for creating the expectation that Microsoft always delivered a better OS than the previous one.

Vista failed to continue the tradition and with hindsight, will be regarded as a practise run for Windows *7*. We'll see how the newest OS performs, but I have a feeling this might be the first truly great Windows.

tsarno@acpmagazines.com.au

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THE NEW, THE NEWS & THE QUIRKY VIEWS

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It was time that someone invented this: a special membrane that cleans out the cavities on computer and phone keyboards. You push the Cyber Clean jelly-like material around the keys and retrieve a whole bunch of disgusting personal debris, which sticks to it. Rinse it after use, and it lasts for up to 75 uses. A 75g bag of Cyber Clean is $6.95.

SEE-YOURSELF CAMERA

Samsung's new ST550 and ST500 compacts come with dual LCD screens on front and back, which allow the subject being photographed to contribute to picture composition. $449 each.

NEW ADOBE

Adobe has released two new versions of its picture editor Photoshop Elements (version 8, for Windows and Mac) and movie-editing software Adobe Premiere Elements. Both Photoshop Elements 8 ($165 full, $125 upgrade) and Premiere Elements 8 ($165 full, $125 upgrade) now come with smart tools, asset organisers and wizards to help take the work out of your video and image editing.

HOT PRODUCT

Flip Mino HD

The Flip HD camcorder finally makes it to Australia.

It doesn't have all the features of a Sony or Canon HD camera; in fact, it's a brutally spartan device, with a couple of buttons, a flip-out USB port, 1.5in electronic screen and not much else, but that's not the point. Made by Mino, which is owned by Cisco, the Flip Mino HD is the mini-camcorder that's been adopted en masse by bloggers and YouTube film-makers because it delivers incredible picture quality for the money (at time of print price was not released, but expected to be under $400). It's basically a little black box containing a high-quality sensor that does 1,280 x 720 16: 9 resolution , a basic lens, and 4GB of storage. We were blown away by the crystal-clear video, which easily exceeds that of most traditional budget camcorders in the $500-$1,000 range. The Flip generates MP4 (Part 10) files using H.264 video compression and AAC audio, which fits 60 minutes of recording onto 4GB of flash memory . The Flip doesn't even have an SD memory card but has a rechargeable battery that lasts two hours .

HOT PRODUCT

GPS goes 3D

Bigger screens and 3D landscapes mark new-generation GPS units.

Fancier 3D navigation software is driving an increase in the size of screens of in-car GPS units. Uniden's newest in-car GPS device, the TRAX 5000, comes with a massive 5in screen to better display fancier 3D maps. The $349.95 unit comes with a variety of 3D mapping technology which makes it possible to virtually view entire blocks of the CBDs of several Australian cities. 3D Terrain Software now shows road elevations and land contours such as overpasses and bridges. The other model, the TRAX 4300, comes with a 4.3in screen and retails for $249.95.

TOP 10 ...CLOSEST ALTERNATIVES

Alternatives, mostly free, to market-leading apps.

1 OPENOFFICE
Version 3.1 is slicker and does the basics as well as Office. Free.

2 KEXI
Kexi costs US$72 but is good and the closest thing to Microsoft Access.

3 THE GIMP
Finally, version 2.8 gets single window mode, just like Photoshop. Yay!

4 TRUESPACE
A free 3D authoring alternative to 3DS Max, from, wait for it, Microsoft!

5 OPEN SOURCE WORKBENCH
A powerful free alternative to Microsoft Project.

6 SCRIBUS
Desktop publishing program that supports CMYK, separations and more.

7 INKSKAPE
Open source vector graphics editor that tries to be like Adobe Illustrator.

8 KOMPOZER
A Dreamweaver wannabe web authoring system. Free.

9 GOOGLE PREMIER APPS GMAIL
Microsoft Office still rules, but Gmail in Google Premier Apps is encroaching.

10 DRIVEIMAGE XML
Who needs Norton Ghost? DriveImage xml backs up logical drives and partitions to image files. Private edition free.

Monster notebooks are on the rise

ASUS has served up a pair of 16in mobile monsters, which redline at 2.8GHz.

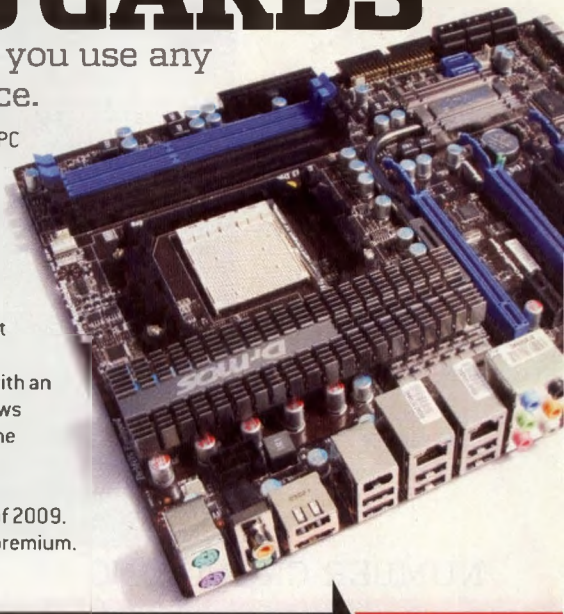
SWEET 16 (INCHES)
ASUS has unveilled a pair of 16in notebooks packing Intel's Core i7-720QM engine.

While Intel officially unveilled its first Core i7 mobile processor at IDF last month, a wave of muscle-bound notebooks built around the quad-core powerplant are coming our way. First out of the gate is ASUS with a pair of 16in notebooks packing Intel's Core i7-720QM engine, which runs at 1.6GHz in quad-core mode but can throttle all the way up to 2.8GHz as a supercharged single-core processor using Intel's 'Turbo' mode without going above the chip's thermal ceiling.

The ASUS G60J backs the quad-core mobile processor with 4GB of DDR RAM, NVIDIA's GeForce GTX 260M graphics card with 1GB of VRAM, a pair of 500GB 7200rpm hard drives, a Blu-ray combo drive and Altec Lansing speakers. Buyers can choose between a 16in HD (1,366 x 768) panel and a 15.6in Full HD (1,920 x 1,200) panel for the same $2,999 price tag.

ONE BOARD, MANY GRAPHICS CARDS

MSI's Big Bang motherboard lets you use any combination of video cards at once.



MSI and Lucid have announced a motherboard that's a first for PC gamers. It uses the Lucid Hydra 200 real-time distributed processing engine as an intelligent load balancer for graphics. What this means in the real world is that the MSI Big Bang that uses the Hydra 200 will support an unprecedented amount of graphics options. For instance, if you have something like an NVIDA 9800 GTX in your closet and you want to toss it into your gaming rig alongside your new GTX 280, you can do that and get the performance gain of both cards.

At the same time if you want to toss in your GTX 280 along with an ATI HD 4770 video card, you can do that too. The new board allows users to use any video card make and model in the system at the same time. The Big Bang mainboard is based on the Intel P55 motherboard and has three PCI Express slots for graphics. MSI expects to offer the board for purchase by the holiday season of 2009. Pricing is unknown, but you can bet the board will command a premium.

TRIBAL COUNCIL...

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Do you text while you drive?

YOU REPLIED
67% **32%** **1% (OH' REALLY?)**

HEAD2HEAD

Two key remote file sync solutions compared: Dropbox and Live Mesh.

	DROPBOX	LIVE MESH
What you do with it	Keep a folder (full of other folders and files you drag into it) synchronised across various PCs.	Create any number of separate folders on an online workspace and replicate and sync them on any designated machine.
How it works	After you install the Dropbox client, it creates a single sync folder on your PC. You drag and drop folders and files into this shared folder and Dropbox replicates and synchs on other machines you designate.	Sign in to the Live Mesh online workspace via your browser, create folders, install the client on your PC and Live Mesh replicates the folders you created onto your PC desktop and any other PC you linked to your Live Mesh account.
Scope	Dropbox only shares folders/files that you drag into the synch folder, so you either have to constantly copy files into it, or just make it the default home for the folders to by synched.	Live Mesh works across your PC's filesystem. Right-click any folder anywhere on your machine, add it to Live Mesh, and it is instantly replicated on other machines. The folder is turned bright blue to highlight that it's a synched folder.
Max size	2GBs. But you get 300MB every time you sign up someone else to the service.	5GB.
Web login	Log in to what looks a file manager, but it's easy to use and comes with great instructions for newbies.	Login to a web-based Windows-style desktop. You could ultimately make your PC desktop and web desktop share exactly the same folders.
Supported OSs	Windows, Mac and Linux. Works on just about any machine, any environment.	Windows, Mac coming soon. Known to clash with some anti-virus software.
Sharing	Designate a folder to be shared and Dropbox sends a notification email to the other user, who needs to sign in to Dropbox to see it or replicate it on their machine.	Designate folder to be shared and Live Mesh sends email notification to other user, who needs to log in with a Windows Live ID. They will get an alias of the folder on their desktop, which they then accept.
Remote control	None.	Live Mesh can "see" the other machines connected to your Live Mesh account. It allows you to log in remotely to and control them. Works like gotomypc.
Verdict	Simple, universal synching solution ideal for synching across disparate PCs and sharing with heaps of friends. We use Dropbox when we can't get the more temperamental Live Mesh working.	More complex, works only on Windows but provides a more integrated synching experience. You don't have to work out of a sync folder, and lets you control other synched machines. When we can get it working, we prefer Live Mesh.

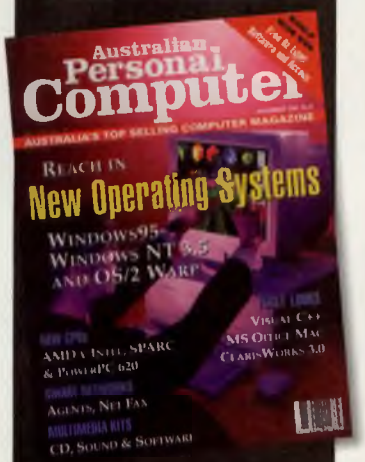
NUMBER CRUNCHING

50%
THE NUMBER OF TECH COMPANIES IN THE TOP 20 MOST VALUABLE BRANDS.
Marketing consultancy Interbrand.

253,400,000
Systems infected with malware in first six months of 2008. AVG tracking.

491,200,000
Systems infected with malware in first six months of 2009. AVG tracking.

THE (A)PC REVOLUTION
NOV / 1994

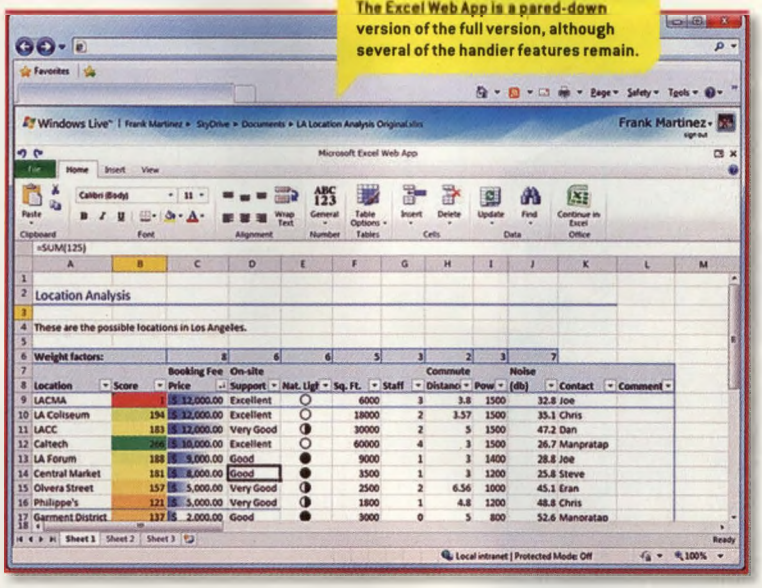


IT'S ONLY AN OPERATING SYSTEM

The new version of OS/2, Warp, was launched in Sydney with enough razzamatazz to rival even the expected opening of the Sydney 2000 Olympic Games. A galaxy of stars, from the laconic Red Symons to the board-wobbling Rolf Harris greatly demonstrated that, as technocrats, they were great performers.

NOW, THE INTERNET AT 500KBS!

While debate rages over exactly how interactive services will be delivered to the home, Telecom is quietly negotiating with News Corp and Microsoft and laying fibre optic cable – 30,000 homes have been passed already – and OptusVision partner Cablevision is talking about Internet and CompuServe access at 500kb. The fastest modem speed to a PC is 28.8kbs. A normal ISDN link runs at 64kbs, 178 times slower than the fibre coaxial link and costs several hundred dollars a month.



EXCEL-LENT
The Excel Web App is a pared-down version of the full version, although several of the handier features remain.

OFFICE ON THE WEB

Office finally heads online as Microsoft previews the first browser-based version of its suite, known as Office Web Apps.

Office used to be one of Microsoft's cash cows, but now it's more about playing catch-up to Google and the era of online apps. Microsoft has taken its most serious step into that with the release of a 'technical preview' edition for its Office Web Apps.

That's the official name for the browser-based components of Office 2010, which like the parent suite are set to debut in the first half of next year. But the invitation-only program is very much a rough-around-the-edges beta. While the finished suite will include lightweight versions of Word, Excel, PowerPoint and OneNote, only the first three are ready for testing.

Furthermore, Word can only view documents, leaving Excel and PowerPoint as the only apps offering the ability to create and edit online documents. A second, broader public beta test is slated for later this year, which will hopefully add fully functional Word and OneNote apps to the bundle. The document format used by each is the XML-based spec introduced in Office 2007, such as DOCX, XLSX and PPTX.

Microsoft pledges that the apps will run in competing web browsers outside its own Internet Explorer. "Consumers want choice and the ability to work across different devices, browsers and platforms during the day," says Michael Schultz, director of marketing for Microsoft Office Services. "We're making Web Apps accessible across PCs and Macs, and available using Internet Explorer, Firefox or Safari."

However, while the apps will be available for free, Microsoft will position them as an obvious companion to Office 2010, even though Schultz promises "seamless integration between Office Web Apps and Microsoft Office versions 2003 and later".

Users of Office 2003 will need to install the necessary add-on pack to be able to open and save the XML-based documents of Office 2007. Office Web Apps will be available to users of Windows Live with storage on the Windows Live SkyDrive service (this is how the technical preview program is being run, with each tester getting 25GB of storage).

Mustknow
Essential Knowledge

HOW MUCH MICROSOFT CHARGES OEMS FOR WINDOWS

One of the most closely guarded secrets of computing is out. A Microsoft executive inadvertently confirmed that Microsoft generally aims to charge OEM PC manufacturers about US$50 for a copy of Windows. Speaking at a tech conference in New York last month, the manager of corporate strategy at Microsoft, Charles Songhurst, also revealed that Microsoft aims to keeps the Windows fee at around 5% of the cost of the PC. When asked a question about whether increased sales of netbooks would affect Windows income, he said: "So if you think about charging $100, $200 or if you think about a super high-end PC, you know, the Sony Vaios or anything that's there for around the $1,000 mark, or the Alienware PCs that are even higher, if we can get that constant percentage then we should be [fine]," Songhurst said.

Topsite
URL of the month

THE MANUALS

There are now specialist search engines of all kinds, but one of the most invaluable is The Manuals, dedicated entirely to searching out manuals for just about anything. A search for "Apple" returned everything from manuals for configuring AirPort to the Apple iPod repair manual.

http://the-manuals.com

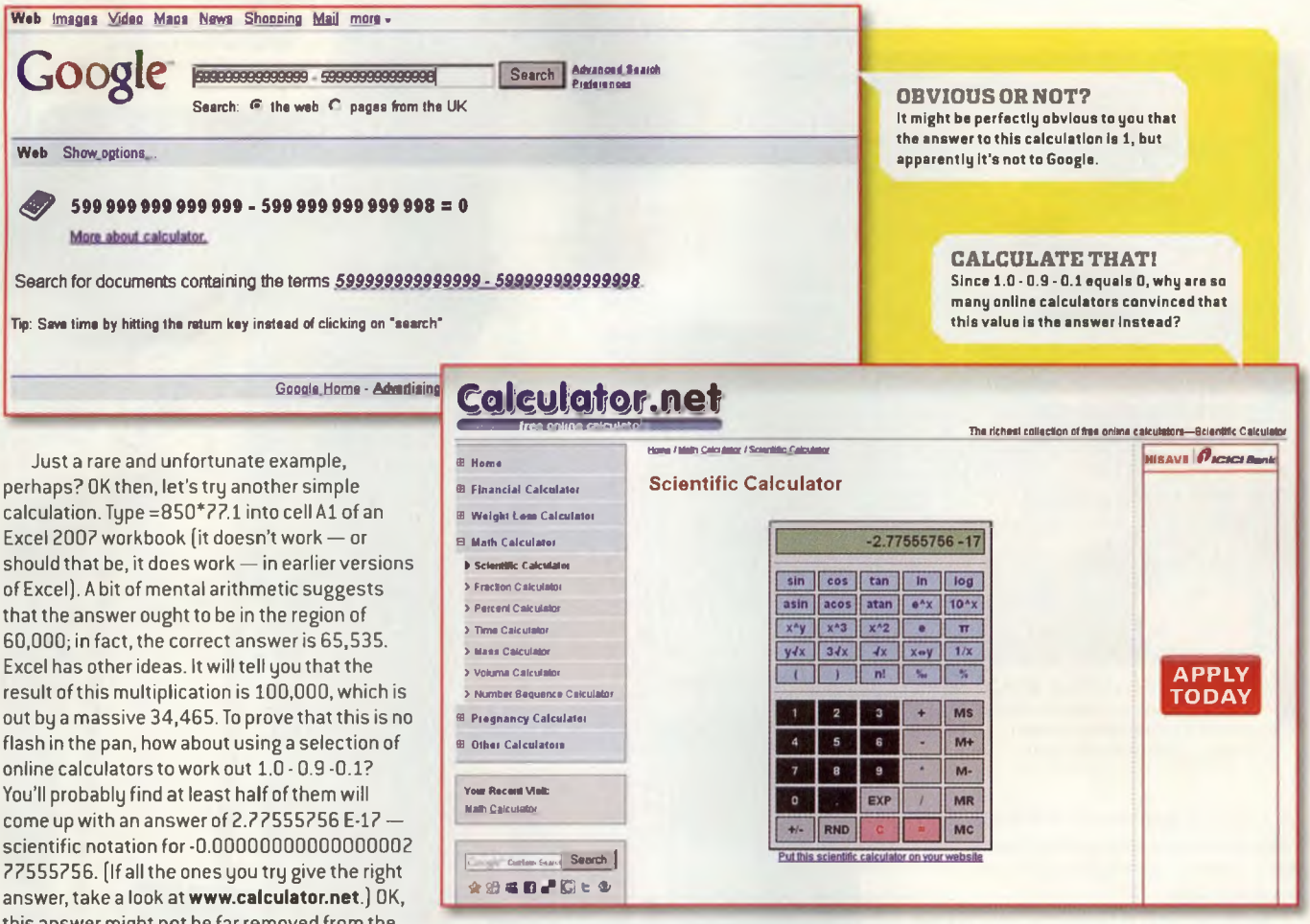
WHY COMPUTERS FAIL AT MATHS

As a machine designed around pure logic, you'd expect computers to be good at maths, but according to **Mike Bedford** this isn't always the case. . .

Computers might struggle to exhibit intelligent behaviour, but blindly performing arithmetic calculations is surely their forte. Or is it? The failure of Google's online calculator and Excel's apparent inability to give correct answers to simple calculations are both well-known problems among programmers, but these aren't really bugs in the normal sense of the word. Instead they're just a consequence of the fact that computers suck at maths. Computers perform calculations in quite a different way from the methods that humans use to do arithmetic — and that means that they habitually come up with the wrong answer. Here we investigate some of the shocking consequences of this revelation before delving into the reason why computers suck at maths.

CLOSE JUST ISN'T CLOSE ENOUGH

For anyone still to be convinced that computers can't get simple arithmetic right, let's start off with a few examples that you can try out yourself. First up, Google's calculator. If you've never tried it out before, to get a feel for how it works, surf to **www.google.com.au**, type 5*9+(sqrt 9)^3 into the search box and click on 'Search'. You'll find that it comes back with the correct answer: (5*9) + (sqrt (9)^3) = 72'. Now let's try another calculation. Type in 599,999,999,999,999 - 599,999,999,999,998. Quite clearly, this should give an answer of 1. Unbelievably, however, Google responds with this: '599,999,999,999,999 – 599,999,999,999,998 = 0'.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More about calculator.
Search for documents containing the terms 599999999999999 - 599999999999998
Tip: Save time by hitting the return key instead of clicking on "search"
Google Home - Advertising
OBVIOUS OR NOT?
It might be perfectly obvious to you that the answer to this calculation is 1, but apparently it's not to Google.
CALCULATE THAT!
Since 1.0 - 0.9 - 0.1 equals 0, why are so many online calculators convinced that this value is the answer instead?
Calculator.net
The richest collection of free online calculators—Scientific Calculator
Home
Financial Calculator
Weight Loss Calculator
Math Calculator
Scientific Calculator
Fraction Calculator
Percent Calculator
Time Calculator
Mass Calculator
Volume Calculator
Number Sequence Calculator
Pregnancy Calculator
Other Calculators
Your Recent Visit:
Math Calculator
Search
Scientific Calculator
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+/- RND C = MC
Put this scientific calculator on your website
APPLY TODAY

Just a rare and unfortunate example, perhaps? OK then, let's try another simple calculation. Type =850*77.1 into cell A1 of an Excel 2007 workbook (it doesn't work — or should that be, it does work — in earlier versions of Excel). A bit of mental arithmetic suggests that the answer ought to be in the region of 60,000; in fact, the correct answer is 65,535. Excel has other ideas. It will tell you that the result of this multiplication is 100,000, which is out by a massive 34,465. To prove that this is no flash in the pan, how about using a selection of online calculators to work out 1.0 - 0.9 -0.1? You'll probably find at least half of them will come up with an answer of 2.77555756 E-17 — scientific notation for -0.00000000000000002 77555756. (If all the ones you try give the right answer, take a look at **www.calculator.net**.) OK, this answer might not be far removed from the correct answer of 0, but why can't the calculator come up with the right answer — an answer that's blatantly obvious to anyone who is conversant with simple arithmetic?

SMALL ERRORS ADD UP

Have a read of the 'How computers do maths' box overleaf and you'll learn that many of the glitches we've seen so far are due to rounding errors. The discrepancy between the computed answer and the correct answer is often minute, and you might be inclined to dismiss this sort of error as insignificant. However, such errors can add up, and the consequences can be serious.

On 25 February 1991, three days before the end of the first Gulf War, an Iraqi Scud missile hit a US airfield in Dhahran, Saudi Arabia. Twenty-eight American soldiers were killed and more than 100 others were injured. At the time, sensitive targets were supposed to be protected by the Patriot surface-to-air defence system, and one battery of Patriot missiles was assigned to the Dhahran facility — so it's pertinent to ask what exactly went wrong. The answer is the system's tracking software, and the problem is not unrelated to our online calculator error.

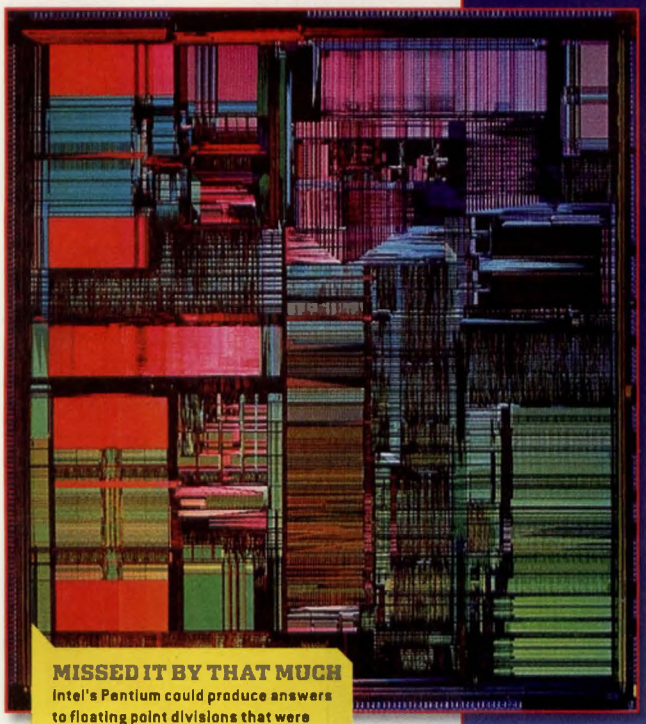
In order to avoid potentially costly false alarms, the Patriot's sophisticated radar must first detect an object that has the characteristics of a Scud missile and then detect it a second time in a position calculated by the system on the assumption that the first fix was genuinely a Scud. Only when this second fix provides a confirmation is a missile launched to intercept it. The calculation of where to look for confirmation of an incoming missile requires knowledge of the system time, which is stored as the number of 0.1-second ticks since the system was started up.

Unfortunately, 0.1 seconds cannot be expressed accurately as a binary number, so when it's shoehorned into a 24-bit register — as used in the Patriot system — it's out by a tiny amount. But all these tiny amounts add up. At the time of the missile attack, the system had been running for about 100 hours, or 3,600,000 ticks to be more specific. Multiplying this count by the tiny error led to a total error of 0.3433 seconds, during which time the Scud missile would cover 687m. The radar looked in the wrong place to receive a confirmation and saw no target. Accordingly, no missile was launched to intercept the incoming Scud — and 28 people paid with their lives.

THE PROCESSOR THAT COULDN'T DIVIDE

Launched in March 1993, the Pentium was Intel's fifth generation of x86 processor. Unlike previous generations, in which at least some family members could only carry out arithmetic on whole numbers, all Pentiums had a floating point unit (FPU). An FPU is a piece of built-in hardware for calculating floating point arithmetic. This gave the Pentium a massive speed advantage, since computers without an FPU-enabled processor had to carry out this sort of calculation using software routines that involved lots of integer operations. Unfortunately, it was a poisoned chalice for Intel.

In June 1994, shortly after taking delivery of a Pentium-based PC, Thomas Nicely — then Professor of Mathematics at Lynchburg College, Virginia — noticed that a program he had written was giving inconsistent results. By running the same program on several machines, Professor Nicely tracked down the problem to his new PC's Pentium processor and, in particular, to its FDIV (floating point division) instruction. Although it affected just a tiny proportion of floating point divisions, at its worst the error was really quite significant. Dividing 4,195,835



MISSED IT BY THAT MUCH
Intel's Pentium could produce answers to floating point divisions that were wrong in the fourth decimal point.

BAD MATHS
Programmers call it an overflow; in reality it was bad maths that caused this $370 million spacecraft to explode.

by 3,145,727 gave an answer of 1.3337, which represents an error in the fourth decimal place, since the correct answer is actually 1.3338.

The Pentium's FPU used something called the SRT algorithm to carry out floating point divisions. Although there are simpler and more obvious ways of dividing one floating point number by another, the SRT algorithm gave a significant speed advantage over previous algorithms. If you're not a mathematician you'll find a description of how SRT works totally impenetrable. However, let's just say that instead of working everything out using 'pure maths', it involved the use of a look-up table. The table contained 1,000 or so values, but due to a production error five of these values were missing. Despite the fact that Intel's CEO Andy Grove reckoned that the average user would only see the problem every 27,000 years, IBM's estimate was once every 24 days — and as a result the company stopped shipping Pentium-based PCs.

Intel eventually agreed to swap defective Pentiums for good ones. Most people didn't take up the offer, but the delay caused technically minded users to make Intel the butt of their jokes. The following is typical. Q: How many Pentium designers does it take to change a light bulb? A: 1.99904274017, but that's close enough for non-technical people.

> THE RADAR LOOKED IN THE WRONG PLACE TO RECEIVE A CONFIRMATION AND SAW NO TARGET. . . AND 28 PEOPLE PAID WITH THEIR LIVES

A BILLION INTO 32,767 WON'T GO

The errors we've seen so far have concerned floating point numbers where accuracy is lost if there's not enough bits to store the mantissa. OK, those errors can add up, but essentially they're just rounding errors, and the likelihood of not having enough bits to store the exponent is comparatively small given that the maximum values they can store are absolutely huge. When integers are involved, the effect can actually be far more serious.

We explain in the 'How computers do maths' box on page 15 that a 64-bit integer can store a maximum positive value of 9,223,372,036,854,775,807. If you try adding 1 to an integer variable that already equals this maximum value, you

HOW COMPUTERS DO MATHS

COMPUTERS APPROACH CALCULATIONS VERY DIFFERENTLY FROM THE WAY WE DO.

Although computers can handle integers (whole numbers), for general-purpose arithmetic they store numbers in floating point format because it's so much more efficient in memory use. Let's take the double precision floating point representation as an example. It uses 64 bits to store each number and permits values from about -10,308 to 10,308 (minus and plus 1 followed by 308 zeros, respectively) to be stored.

Furthermore, fractional values as small as plus or minus 10-308 (that's a decimal point followed by 307 zeros and then a 1) can be stored. By way of contrast, if the same 64 bits were used to store integers, the range would be –9,223,372,036,854,775,808 to +9,223,372,036,854,775,807, and fractional values couldn't be represented.

The secret to this apparently amazing efficiency is approximation. Of those 64 bits, one represents the sign (so whether the value is positive or negative), 52 bits represent the mantissa (that's the actual numbers) and the remaining 11 bits represent the exponent (how many zeros there are or where the decimal point is).

ROUNDABOUT?
Even the most advanced processors today handle arithmetic in a way that can result in small rounding errors.

So although a much greater range of numbers can be stored using floating point notation, the precision is actually less than what can be achieved in integer format, since only 52 bits are available.

In fact, 52 bits of binary information represent a 16-bit decimal number, so any values that differ only in their 17th decimal point will actually be seen as identical. The situation with Google thinking that 599,999,999,999,999 - 599,999,999,999,998 equals 0 is similar, although it's evident that Google's calculator actually uses less than the normal 52 bits for the mantissa.

That some calculators give a non-zero result to the calculation 1.0 - 0.9 - 0.1 might seem different, since we appear to be nowhere close to the limit of 64-bit floating point arithmetic. But that's forgetting one important fact: that computers work in binary.

And although 0.1 might have only one significant digit in decimal, in binary notation the mantissa is a repeating sequence.

This means that 0.1 can never be represented accurately in binary, no matter how many bits you use.

don't just lose that extra value. Instead, the integer overflows. In other words, as far as a computer working in 64-bit integer arithmetic is concerned, 9,223,372,036,854,775,807 + 1 = -9,223,372,036,854,775,808 (note the minus sign).

Something very similar happened on-board the European Space Agency's Ariane V rocket on its maiden flight. In fact, the arithmetic operation in question — if you can call it that — was even simpler than adding 1. Instead, it just involved copying one number that had been stored in floating point format to another location that was defined as an integer — and a 16-bit integer at that (maximum positive value of 32,767). Unfortunately, the number was already too large to fit in the integer location, and as a result it overflowed. The exact sequence of events that followed is pretty complex but, to cut a long story short, the end result was that the Ariane V became one of the most expensive fireworks in history.

GUARDING AGAINST COCK-UPS

This run-through of some of computing's most astonishing mathematical cock-ups may have come as something of an eye-opener to you. If so, you're probably wondering whether tomorrow's computers can avoid making such elementary mistakes. Surprisingly, perhaps — and with the exception of the Pentium floating point error, which was caused by a hardware glitch — all of the errors we've mentioned here could have been prevented. In that sense, they can all be thought of as software errors.

As an example, let's take that integer overflow on the Ariane V rocket. That an integer can overflow isn't an error on the part of the processor because it's the way it's supposed to work. But whenever an integer does overflow, the processor sets something called a flag that the program can interrogate. In the case of the Ariane software, the program didn't check for an overflow; if it had done, corrective action could have been taken.

Of course, there will always be a limit to how large an integer can be and how much precision a floating point number can have — and this depends on the processor. But all of today's computers are universal computing machines, which means that they can solve any problem involving logic and maths. So if a processor's internal instructions can't operate on large enough integers or on floating point numbers with sufficient precision, it's always possible for the programmer to implement arithmetic routines that will. There will be a trade off against speed, though, which is why this isn't usually done.

However clever the software or however much memory you use to store a floating point number, the result of some divisions will never be accurate. We've seen how 1 divided by 10 is an infinite string in binary, and, in the general case, a move to decimal arithmetic wouldn't help either: 1 divided by 10 can be stored accurately in decimal, but 1 divided by 3 equals 0.3333333... ad infinitum.

The bottom line is that whatever number base you choose, some divisions will produce results that can never be stored accurately as a finite number of digits. Even this isn't a show-stopper, though. Remember how 1.0 - 0.9 - 0.1 often yields an inaccurate answer because of rounding errors even though we know, immediately, that the answer is 0? Well, it's quite possible to write software to store the result of a division as a rational number. In other words, you don't actually do the division — you just store the two numbers. In subsequent arithmetic operations you handle the values as fractions, just as you were taught in school, and the result will be exact.

So computers might suck at maths, but there's always a solution available to circumvent their inherent weaknesses. And in that case, it's probably more accurate to say that computer programmers suck at maths — or at least some of them do. APC

FACT FILE

Because the result of floating point divisions usually aren't stored accurately, programmers learn to avoid instructions such as 'IF A = 1 THEN ...' in favour of 'IF ABS(A-1) < 0.0000001 THEN ...'. Failure to do this has resulted in programs that just loop forever rather than actually coming up with an answer.

16 epinions
HAVE YOUR SAY

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THIS ISSUE'S WINNER

Chris Henderson wins a TP-Link Wireless N ADSL/ADSL2+ modem router worth $149. Available from **www.anyware.com.au**

Letter of the month

EFFECTIVE NOISE-CANCELLING

I recently had a job that involved a lot of flying in light aircraft to remote communities. Sitting in a small plane for hours on end can get tedious, and I wanted to listen to music instead of the engines: classical being my preference.

I bought a pair of expensive noise-cancelling headphones, but found that they weren't really effective and merely dulled the outside roar. By far the best solution is also by far the cheapest: a pair of well-fitting earbuds with soft surrounds, covered by a pair of good quality industrial ear protectors. External noise is virtually non-existent, and the music nearly as good as at home.

Chris Henderson
Acton Park, Tas

OLD-SCHOOL SOLUTION
Noise-cancelling headphones may be all the rage, but one *APC* reader found a simpler solution...

Windows 7 is here, but not everybody is eager to line up and buy the new operating system...

WINDOWS 7 WORTH IT?

I sit back thinking about the Windows 7 release and wonder whether to go down the path or not. While every report tends to promote the greatness of it, I hesitate at what other upgrade options I might also be forced into, along with the prospects of more redundant equipment.

Late last year I decided with the failure of some old parts in my primary computer to again build a new one and took the plunge on Vista Home Premium after many years of joy using XP. After building and loading all my other faithful software and hardware, I found that two vital items, Lotus Smartsuite and a 12-year old Kyocera FS1000+ printer, no longer worked, and no upgrade or driver was available for them.

So, where to with Win 7 and does it mean more of the same? I soon want to look at some video editing and photo work. I am sure the new Intel Core i5 and associated mobos look good, but I will probably need new memory, an HDD, a new monitor and a new OS, which will mean going to Win 7. But then, what of all the other computer items that will not work anymore, so new software, a printer etc?

Colin Hussey
Shalvey, NSW

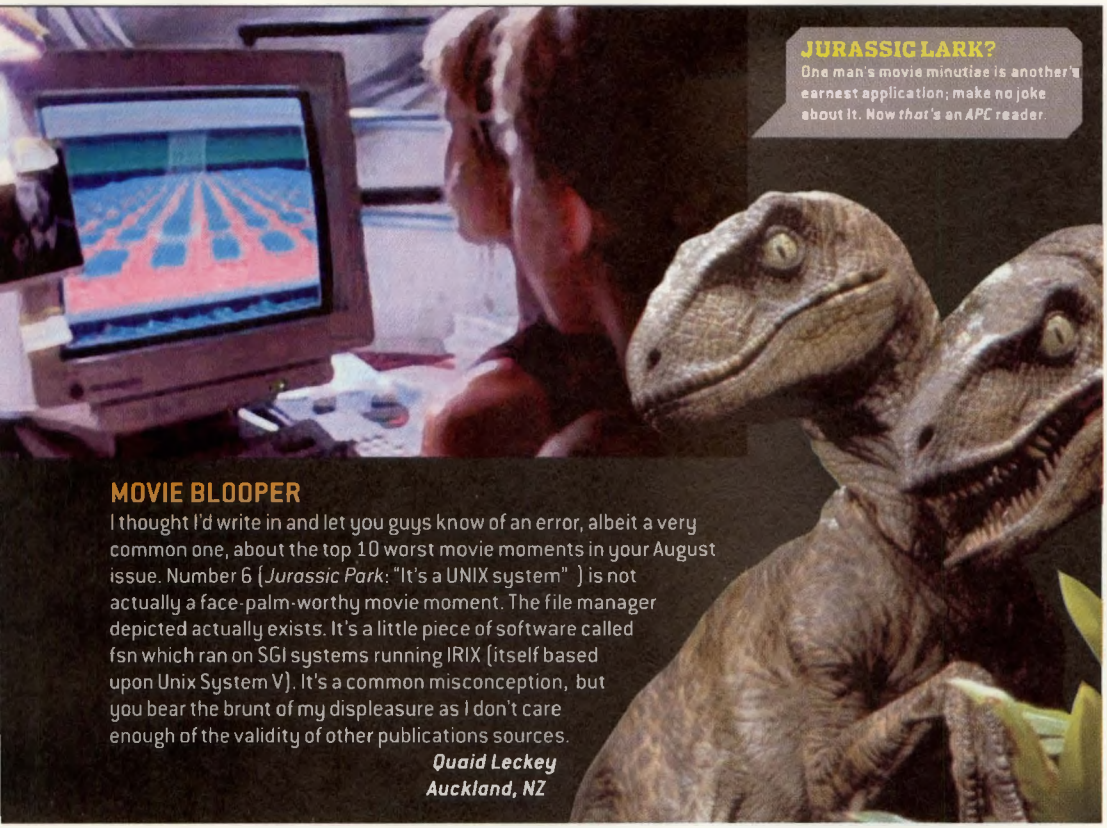
HERE WE GO AGAIN

Well so much for Windows 7 being the saviour. I downloaded the 64-bit version to see if programs I use would work. First I installed the video editing program I use (Adobe Premiere Elements 7), no problem. Then I tried my camera software (Sony DR-SR8E high-definition). Windows 7 would not even look at it. Although I am able to look for updated software I feel that I should not have to. I pity the average computer user who has no idea how to fix Microsoft's mess. Windows 7 just appears to be a Vista with a new coat. Can we please stop magazines telling us how good Windows 7 is until Microsoft can put out a product that does not need an IT expert to get it working?

David Dewar
Blacktown, NSW

IPHONE PROBLEMS

In response to Dr Adrian Elderhurst in Epinions October issue, the reason he does not hear his iPhone ring tone after removing the earphone plug is not a short circuit, but no circuit. Inside the earphone socket is a set of simple changeover contacts. Any debris caught between the output contact and the phone's speaker contact will cause a failure of this connection and result in no audio being heard from the phone. It remains hard to clear this debris as, with the earphone plug removed, the debris is held between the two contacts via the spring pressure of



JURASSIC LARK?
One man's movie minutiae is another's earnest application; make no joke about it. Now *that's* an *APC* reader.

MOVIE BLOOPER

I thought I'd write in and let you guys know of an error, albeit a very common one, about the top 10 worst movie moments in your August issue. Number 6 (*Jurassic Park*: "It's a UNIX system") is not actually a face-palm-worthy movie moment. The file manager depicted actually exists. It's a little piece of software called fsn which ran on SGI systems running IRIX (itself based upon Unix System V). It's a common misconception, but you bear the brunt of my displeasure as I don't care enough of the validity of other publications sources.

Quaid Leckey
Auckland, NZ

the output contact. As a side note, I would suggest to the doctor to use a reliable, mature technology for on-call hospital notices. I would not put someone's life in the hands of relying on an iPhone.

Vlado Novak
Wodonga, Vic

FAST, STILL EXPENSIVE

With the Australian Government rolling out the optical fibre network across Australia and finally taking assertive measures against Telstra to put an end to the monopoly that they have held for far too long, things seem to be looking up for the average home user. With the packages offered for ADSL2+ being still quite unattractive in price and rarely being without a phone bundle it is quite easy to see why most people like to stay on ADSL1. But why are the plans getting more expensive for ADSL1? It's not that the unlimited wholesale accounts are getting bumped up. The pricing for some ADSL plans are almost like a mortgage repayment. If we keep up this trend we won't have to worry about broadband as we won't be able to afford to get it connected. Or if you do and you download a Linux ISO you will have to get a personal loan to cover the download costs. Come on all you ISPs, don't just let the government be the ones to bring us into the 21st Century.

Todd Place
Cairns, Qld

FRIES WITH THAT

Darrin Ritter's analogy (September 2009) in which he compares buying a Windows PC to buying a hamburger but forced to take fries and drinks (Windows) is incorrect. Buying a PC bundled with Windows is simply like buying a cheeseburger by itself. Buying a PC with a router and printer is more akin to buying a burger with fries and a coke. A more accurate analogy of a PC without Windows is being able to order a burger without pickles, or tomato. This can be done, but the burger still costs the same and most people accept this and simply pay for it.

Computers are not sold as kits. They are a complete package. You can buy a Windows computer, a Mac with Mac OS and even from some suppliers a Linux computer. Of course you can even buy some computers without an OS, but these are usually not brand-name machines and are effectively pre-assembled kits. Computers are sold with very skinny margins and the cost of the time unbundling (or bundling) Windows on demand would mean that the computer would cost the same either way.

Vendors have a right to sell their products in any configuration they like at a fair price.

Mark Dutton
South Perth, WA

apc

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enduser

FROM THE READERS OF APC

apcenduser@acpmagazines.com.au

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Telstra showcase

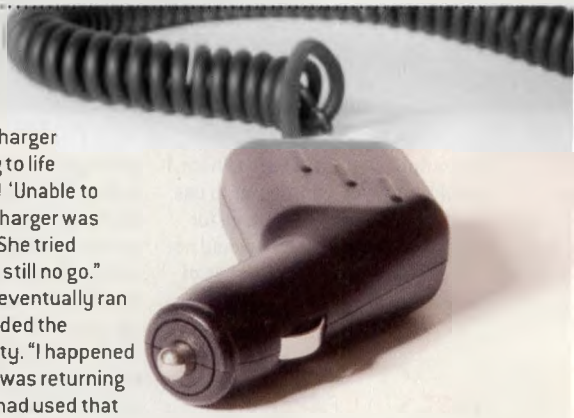
Reader Marc Puz from Valley View, South Australia, went to the Royal Adelaide Show recently and visited the Telstra display looking for a deal on internet, mobile phone, landline and even Foxtel. "They had a large sign suggesting I could even score myself a 4GB micro SD card and that I should 'ask [them] how'". An understandably excited Puz was disappointed however, when he couldn't find any Telstra staff anywhere in the Telstra stand. "Naturally, I assumed the computer screens were self-serve so I proceeded to navigate the menu on one. There was no mouse. I figured it must be a touch screen. How stupid I must have looked touching links on the non-touch screen LCD monitor. So I went to the next computer, which did have a mouse. Every link I clicked took me either to a 'page cannot be displayed' or back to the main screen. The next screen was frozen: the mouse pointer didn't move. As I left without a new mobile, internet/phone bundle or micro SD card I couldn't help but reminisce about the last time I actually called them for assistance. At least Puz was happy that he managed to have his photo taken on a police motorcycle a few stands away.

MAGNETIC BRACELETS MYSTERY SOLVED

David Wilson congratulates John Curtis (*APC* End User Oct 08) on his observational skills in determining that a magnetic bracelet was causing his mother's Dell laptop to spontaneously shut down. But he adds that Curtis did not take the final step to understand why this was so. Wilson doubts that it was a "a phantom input" as Curtis put it. "Laptops have a lid switch to allow them to sense when the lid is closed and Windows (and other operating systems) can use this to shutdown or hibernate or even suspend the laptop when the lid closes," Wilson says. "One implementation is to embed a magnet above the screen and use a magnetic sensor near the mouse pad to detect the screen magnet's proximity. Holding a compass near the top edge of the screen will confirm if this is the case."

STUMPED BY BATTERY

A reader was amused by a recent End User item on an engineer with a PhD who put batteries into a walkie talkie without removing their plastic wrapper. Allan Hewson from Canberra says a colleague was given a used business mobile to temporarily replace her faulty mobile, but the phone would not turn on after she replaced the SIM. "She thought it must be the battery," says Hewson. "She plugged the phone charger in. The phone sprung to life briefly but displayed 'Unable to charge.' Maybe the charger was faulty, she thought. She tried another charger, but still no go." Hewson's colleague eventually ran out of ideas and decided the battery must be faulty. "I happened to walk by when she was returning the 'faulty' mobile. I had used that mobile only a few days before and it was fine. I asked if she had inserted the battery when she inserted her SIM (the SIM compartment is behind the battery). She looked at me and said 'What battery? Wasn't the battery built-in?' I now understand why Apple built their phone with a non-replacement serviceable battery."



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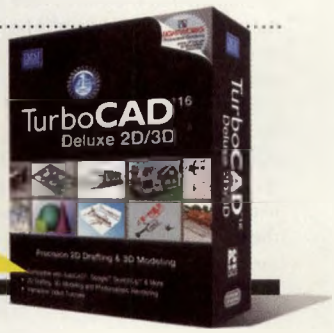

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NEW

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watchdog

KEEPING AN EYE ON VENDORS!

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Has an IT vendor or telco stuffed you around? Let us know about it and we'll chase them for a solution on your behalf. Letters sent to **watchdog@acpmagazines.com.au** must include the writer's full name, street address, suburb, state and phone number to be considered for print publication (please also include details such as invoice numbers and people you've spoken to). Address and phone details will not be published. All correspondence becomes the property of *APC* and is subject to editing.

Repair your PC, lose the data

Back up your disc before sending it to be fixed. Two cautionary tales from APC readers.

Port Headland reader Tam Batalin, who proudly describes herself as a "middle-aged housewife," ran into a problem with her eight-month-old Toshiba Satellite notebook while configuring updates. It was under extended warranty so she took it to Harvey Norman Port Headland after being told they would send it away for repair.

She says: "I asked the sales girl to keep me posted, because I was willing to pay a professional to have a look at it; she assured me that I would be contacted and that it would take three to four weeks. Eight weeks later, after ringing them every week and even driving to the store, I got my computer back. But they did a complete system wipe without backing up anything on my computer. I was devastated. I had previously backed up on disk 75 per cent of my important stuff, but stupidly I did not get a chance to save anything for the last three months. On top of that, as you experts would know, I am now having to go through the painstaking task of downloading everything back onto my computer."

Harvey Norman Port Headland have since called Tam, and have apologised, explaining that someone at the store tried to fix the computer, rang Toshiba and was told to perform a system wipe.

Tam says "My questions have been answered, and even though I have been burnt badly, hopefully readers will take this as a warning and make sure the same thing does not happen to them."

FOUND THEM!
Recuva software is one of the best free undelete programs. This screenshot shows a list of files that have been detected and are ready to be recovered by the software.

First thing to bear in mind is that if a repair person reformats your hard disk, all is not lost. A reformat and new OS installation don't wipe all the files, which disappear only if overwritten by new data. Unfortunately, Tam began copying some old backed-up data to the disk, which has now probably overwritten existing files, but we have nonetheless advised Tam to run some free data recovery software, Recuva (piriform.com/recuva). This worked for another reader who had a similar problem, Steve Farmer from Melbourne. When the screen on a notebook belonging to Farmer failed, a friend suggested he call a local technician.

Farmer says "My mate said there was this mobile repairer calling himself the 'Tech Wizard of Oz' so I called him and he popped round. The alarm bells should have rung when he turned up on a motorbike instead of a van. As it turns out, he did repair the notebook, but my heart sank when I booted it up and I could see a spanking-new Vista installation. All my data was gone, including a lot of stuff to do with my work.

Farmer ran the Recuva undelete software, and to his astonishment was able to retrieve most of the data he lost (but not the programs). But undeleting reformatted drives is a last resort. Rodney Kordi, a representative from Gizmo, a computer and network setup and repair service, provided Watchdog with some strategies for when a computer fails and you want to ensure safekeeping of the its data.

"We always encourage customers to back up their important data to an external HDD or online backup service before having any work done on their computer. If this is not possible, because the computer hard drive is not working, then our advice is to ask your repairer what backup protocols they have in place to protect your data during service. Professional repair service providers will be able to walk you through the processes that they have in place to ensure that your data is not lost.

"You should also ensure that the repairer knows that you want your data saved. In the worst case scenario where even the repairer is not able to backup your data because they cannot get the hard drive going again, then we recommend you contact a data recovery specialist." apc

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22 thelab

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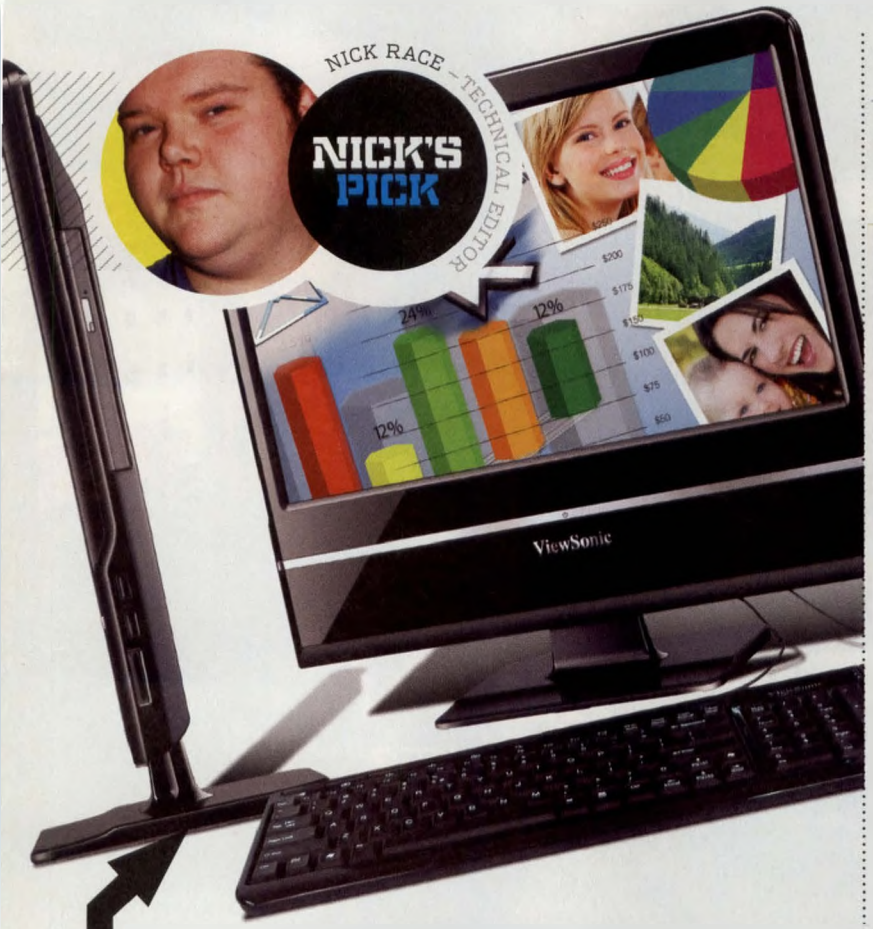

VIEWSONIC VPC100

It's rare to see a big vendor like ViewSonic jump the fence from one type of business to another. This is the first attempt at a PC from the big display vendor. ViewSonic's chosen the 'netbook build' solution to power the panel PC, with an Atom processor, 1GB of RAM and an Intel 945 chipset.

PERFORMANCE ✪✪✪

Considering it packs just as much punch as a netbook, the VPC100 isn't breaking any benchmark records. However, it's low performance is perfectly suited as an internet-browsing, word-processing and MP3-playing system.

PRICE ✪✪

At $899, not that cheap. Though it's got a nice big 18.5in screen and the functional components you need, it's still a bit overpriced. If other vendors jam the same specs into a netbook at almost half the price, we'd expect a bit more.

SETUP ✪✪✪✪

It's a nice design. The screen looks good, with a nice black casing with chrome trim and is slim enough to fool most into thinking it's just a regular monitor. A DVD drive is a nice touch, making it a lot more useful as a general-purpose PC.

LABS ROUND-UP

WINDOWS 7 BEST BUILDS

Nick Race builds four different PCs all offering different advantages for running Windows 7.

50

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7/10

Sony VAIO W Series

It may be a netbook, but it still looks like a Sony.

Sony
www.sony.com.au
$999

Attractive; 1,366 x 768-pixel resolution; compact size. ✔

Limited battery life; pricey; cramped keyboard. ✖

SPECIAL FEATURES
1,366 x 768 resolution screen
Intel Atom N280 Processor
160GB hard disk drive

Premium hardware designs and netbooks don't usually mix. But Sony has managed to pull it off with its first official netbook, the VAIO W.

Available in pink, white and brown, the VAIO W neither looks nor feels like your typical netbook. It uses the same type of hardened plastic, but the combination of tapered edges, rounded corners and extra details like the dimpled texture on the keyboard base and embossed VAIO logo on the lid give it that extra bit of class that's typically missing on a netbook.

To satisfy the requirements of a Windows XP Home Edition ULCPC license, vendors are restricted in the hardware spec, which is why netbooks tend to offer the same features: a 1.66GHz Intel Atom N280 processor, 1GB of RAM, a 10.1in screen and 160GB hard drive. But there are a couple of qualities that set the VAIO W apart, mainly the 1,366 x 768-pixel resolution screen (substantially larger than the netbook standard of 1,024 x 600) which means less scrolling when browsing the web.

Sony has managed to include a decent-sized touchpad, but at the expense of keyboard size. Its saving grace is that it uses an isolated Scrabble-tile design with keys that are just large enough to touch type with reasonable accuracy and comfort, although the tiny tab, caps lock and right shift keys take some getting used to.

Performance-wise, it doesn't yield any surprises. Its hardware spec is pretty much the same as other netbooks, making it good for web browsing, streaming (standard definition) video and word processing, and not so good for gaming, image editing and other processor-intensive tasks. Where the VAIO W falls behind is battery life. It uses a three-cell battery, and using the VAIO Ultimate Battery profile, we could only squeeze out three hours with reduced system performance.

Jenneth Orantia

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6/10

MSI X-Slim X600

Super slim and super slow.

MSI
www.msicomputer.com.au
$1,699

25mm design; great screen; discrete graphics. ✔

Very, very slow. ✖

SPECIAL FEATURES
15.6in screen
4GB RAM
ATI Mobility Radeon HD 4330

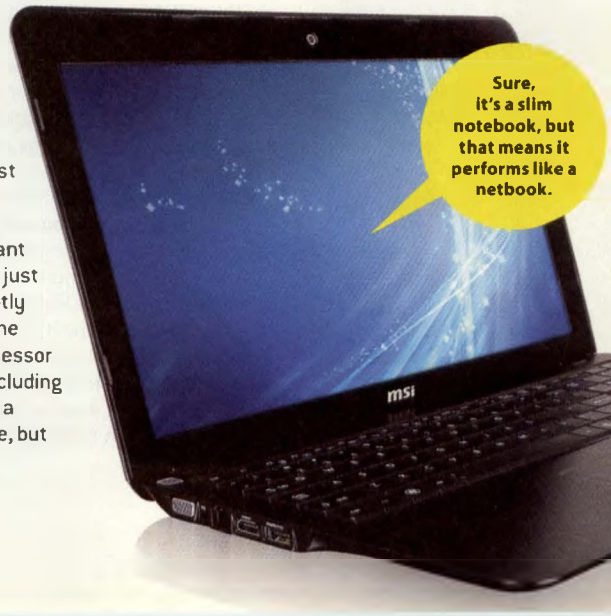
The MSI X-Slim X600 is the perfect example of a slim and light notebook. It's one of the thinnest we've seen at just 25mm when closed. It measures 392 x 255mm (WD), that's because it packs a full 15.6in display.

To keep its profile, MSI has removed the internal optical drive. Whether this is a deal-breaker is up to you, but external drives aren't too bulky to carry around if needed. What MSI has included over the usual thin and light design is a discrete graphics solution. The X600 includes an ATI Mobility Radeon HD 4330 with 512MB, which is more than ample for multimedia and Windows Vista/Windows 7.

The system's hard disk drive is great, with performance better than expected. 4GB of DDR2 is also very handy and saves some extra dollars upgrading in the future. The bad news is that the X600 is *slooooow*. The Intel Core 2 Solo processor (single core!) at 1.4GHz drags its feet, stopping the X600 from being a serious contender as a full-time notebook or desktop replacement. On the bench the X600 earned a paltry 1,822 in PCMark Vantage.

On a lighter note, the battery life was acceptable, lasting just under four hours. This model is truly a mixed bag. Ultimately, we want to like the X600, but it just crawls. MSI has valiantly tried to work around the limitations of the processor by upping the RAM, including discrete graphics and a snappy hard disk drive, but it seems all for naught. In the end we need to think of it as an oversized netbook, and in that regard it works. As a thin and light notebook, however, we're sacrificing too much performance just for a few extra millimetres.

Nick Race



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7/10

Sygic Mobile Maps

iPhone's first turn-by-turn mapping program.

Sygic
www.sygic.com
$79.99

Detailed 3D maps; fast GPS lock; great-looking interface. ✔

Overuse of U-turns for rerouting; no spoken street names. ✖

SPECIAL FEATURES
Turn-by-turn directions
WhereiS 2009 maps

Amidst the dozens of novelty fart programs and beer-drinking apps in the iPhone App Store, it's rare to find an application that costs over $10. From that perspective, most users would probably baulk at the $79.99 asking price of Sygic Mobile Maps — the first turn-by-turn navigation program for the iPhone with Australia and New Zealand maps.

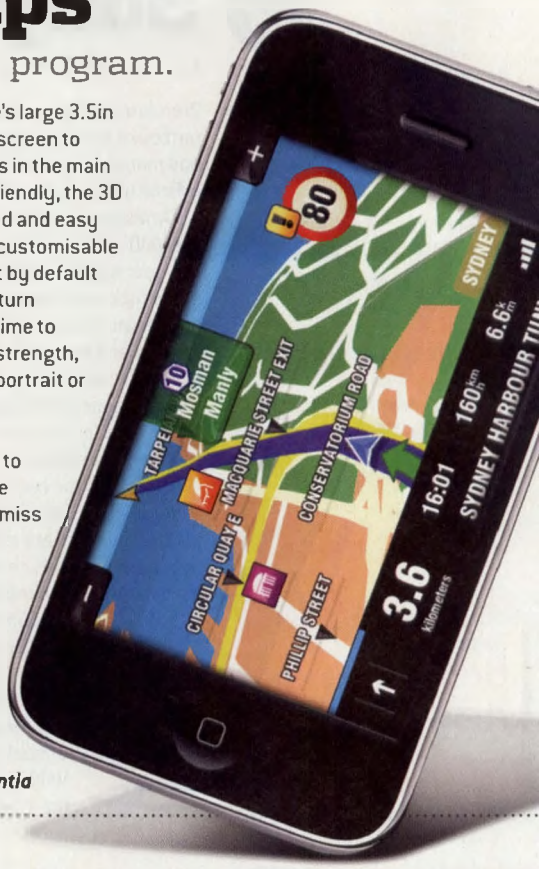
After testing it we can recommend this pricey app as a capable in-car GPS replacement. It's missing some of the features that the current standalone portable navigation devices have, like spoken street names, live traffic updates and speed camera alerts (although the latter is included in the latest version that's waiting for Apple approval), but for basic street-level turn-by-turn mapping, it works better than any other smartphone GPS program we've tried.

Mobile Maps uses WhereiS 2009 maps, and it's a relatively large 204MB download, but it loads quickly, and unlike Google Maps, you won't need to download anything extra once it's installed.

Sygic has put the iPhone's large 3.5in 480 x 360 capacitive touchscreen to good use: the colourful icons in the main menu are large and touch-friendly, the 3D mapping interface is detailed and easy to read, with a TomTom-like customisable info pane at the bottom that by default shows distance to the next turn and other stats like speed, time to destination and GPS signal strength, and it works equally well in portrait or landscape orientation.

Entering an address is straightforward, but having to select the country each time seems unnecessary. If you miss a turn, Mobile Maps adjusts the route to get you back on track, but more often than not it suggested a U-turn in improbable places like motorways and intersections instead of legitimate alternative roads.

Jenneth Orantia



8/10

HTC Snap

Advanced email in a tight package.

Telstra
www.telstra.com.au
$0 upfront to Telstra plan

Slim form factor; attractive; well-designed keyboard. ✔

Boring interface; proprietary headphone jack; only 256MB. ✖

SPECIAL FEATURES
Only 12mm thick
Full QWERTY keyboard
Exchange support

An ultra-slim physique, QWERTY keyboard and full complement of messaging and email features show that HTC is still gunning for the BlackBerry crowd.

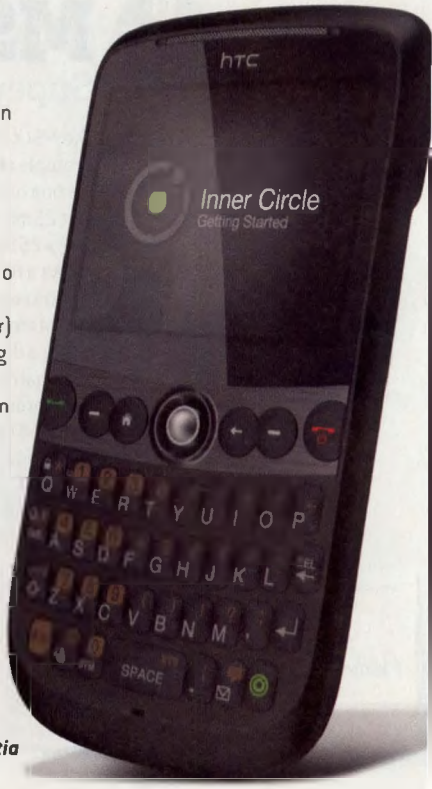
HTC has the sex appeal part down pat. At 12mm thick, it's considerably slimmer than the standard QWERTY smartphone, and the soft rubberised coating and tapered edges make it a delight to hold. The front features a 2.4in QVGA display and four-row QWERTY keyboard, and in between is a bank of buttons and a trackball that's not unlike the one found on BlackBerrys.

HTC has made a name for itself in Windows Mobile by customising the interface with lots of fancy 3D graphics and widgets — sadly, this doesn't extend to the Windows Mobile 6.1 Standard system on the HTC Snap. The sliding panel layout for moving between different bits of information like the time, missed calls, email, weather and music is slick, but it's slow to navigate and less intuitive than the TouchFLO 3D plug-in on HTC's touchscreen smartphones.

The rest of the interface feels extremely dated, with its flat 2D icons and simple icon-based navigation. HTC has added a few extra programs to the standard Windows Mobile build like Audio Manager (substantially better than the long-in-the-tooth Windows Media Player) and HTC Album, but the most interesting addition is the Inner Circle feature — essentially a filter that brings email from a preselected group of people to the top of your inbox with a single click.

As a messaging phone, the HTC Snap ticks all the right boxes: 7.2Mbit/s HSDPA, 802.11b/g Wi-Fi, support for POP, IMAP and Microsoft Exchange email accounts and threaded SMS and MMS. The keyboard is a little cramped, but the domed tops on the keys make up for it — our only gripe is the positioning of the TAB key, which is where we expect the letter A to be.

Jenneth Orantia



9/10

Samsung Omnia Icon

The most desirable Windows Mobile smartphone yet.

Samsung
www.samsung.com.au
$899

Sexy hardware; slick custom graphics; multimedia capabilities.

Slight learning curve to interface; lags with lots of programs open.

SPECIAL FEATURES
3.7in display
HSDPA, Wi-Fi and GPS

With the Omnia Icon Samsung has established itself as a smartphone force to be reckoned with. It has crammed in an 8GB flash drive and 3.5mm headphone jack, and it's also beat HTC with a 100% skin of Windows Mobile 6.1 Professional.

Every aspect of Windows Mobile has been replaced with a prettier touch-optimised Samsung interface. Three homescreens have replaced the Today screen, which you can populate with a decent selection of widgets, and a Mac OS X-style dock.

Tapping on the Start icon to get to the main menu launcher isn't immediately obvious, but the drop-down menu has thankfully been replaced with a customisable full-screen launcher that's divided into different categories. There's also a handy task switcher that lets you move between open programs.

The Omnia Icon is the first Windows Mobile phone that we can actually recommend as a portable media player.

As well as the 3.5mm jack and 8GB flash drive (plus microSD expansion), it's got a vibrant 3.7in AMOLED WVGA resistive touchscreen with near-infinite viewing angles and the Samsung Touch Player that supports MP3, WMA, AAC, DivX, XviD, H.263/4 and WMV9. An XviD episode of *Weeds* played back beautifully without any extra encoding, although you'll need ActiveSync or the equivalent Mac software to transfer files from a computer, as it doesn't mount as an external hard drive.

Other features include a 5MP camera with auto-focus and LED flash, an FM radio, 7.2Mbit/s HSDPA, 802.11b/g Wi-Fi and GPS. For all these features, you'd expect a much larger phone, but it's on par with the iPhone and equally attractive. A 667MHz Samsung S3C6410 processor gives good system performance, although it slows down with the more applications you open.

Jenneth Orantia

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5/10

Pioneer DreamVision Mini Fanless Green PC

Fanless? That's not quite true.

Pioneer Computers
www.pioneer.net.au
$599

Very small indeed; good hardware options; cheap.

Annoyingly noisy; underpowered.

SPECIAL FEATURES
Intel Atom 230 processor
Nvidia Ion platform
Highly configurable

It's rare that a PC is some three times thinner than the lenght of its name but I could stack three Pioneer's Minis in less space than the width of its title. It makes ASUS's Eee Box look like a bloater and it comes with two stands: one to stand it vertically and one to add it to the back of a monitor.

The base model costs $399 but there are plenty of upgrades you can make. However, everything must be based around an Intel Atom 230 processor. At 1.6GHz, it's not powerful but if it can run basic Windows and Office tasks that should suffice.

It's based upon Nvidia's Ion platform and our model had Nvidia's 9400M graphics chip (with 512MB of RAM) instead of the standard 256MB SiS graphics. Our unit also had 2GB of RAM (1GB standard) and a 320GB 5,400rpm notebook hard disk instead of the regular 160GB. Optional hard disks range from 64GB SSDs up to 500GB 7,200rpm drives.

You can add wireless (802.11b/g) via USB for $19 and an external, slim DVD writer will cost $189. Our review unit came with Vista Home Basic but you can choose between all versions of Vista plus XP. The monitor/TV/wall mounting kit costs an extra $39 and if you want to boost the one-year RTB warranty to onsite that will cost $49.

No monitor, keyboard or mouse are included but Pioneer will sell you just about anything else you need to get up and running.

As it is, the 2GB RAM helps keep Vista ticking along nicely, but the low-powered components can only do so much. It's disappointing that netbooks and small PCs like this struggle with Flash and high-bit-rate media and the Mini is no exception. Some clips on YouTube regularly stuttered, even despite the supposedly-beefier components like Nvidia graphics. Playing videos in their HQ variants was impossible.

However, for the undiscerning user who simply wants to, say, add computing power to their TV or a spare monitor, it can still be attractive as it copes with regular web browsing and basic office tasks with no problems. Media playback from pictures to video depended on their quality and size: it struggles with high-quality files.

For connectivity there's a DVI port at the back along with Gigabit Ethernet and four USB ports. At the front, a flap reveals two more USB ports plus two audio jacks. There's another audio jack on the back but sound carried happily through our HDMI-DVI converter cable.

It's white 0.5-litre chassis looks good, even though you'll almost-certainly hide it out of view. As such it sets itself up as a great discreet, little PC. There's just one teensy tiny problem. You know in the title where it says 'Fanless'. That's not exactly true. Every few minutes, even when idling, a tiny fan goes into hyperspeed trying to cool the components down. We wouldn't mind if it was a low-pitched, quiet whir, but it's a very annoying high-pitched whine, which is very audible even in a crowded living room.

So it's difficult to recommend Pioneer's Mini. With products using Nvidia's Tegra platform launching in the coming months, it's almost certainly a better bet to wait for those. They'll be even smaller than this and much more powerful: enough to play HD video and Flash anyway.

Other alternatives include netbooks, which offer similar specifications and power — along with a screen and battery. Otherwise we'd recommend ASUS's Eee Box. This might be more expensive but it's a bit more powerful and comes with good wireless accessories. The Mini is just too dang noisy.

Nick Ross

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ViewSonic VPC100

ViewSonic's first PC offering.

ViewSonic
www.viewsonic.com.au
$899

Looks good; quiet; good value; small.

Slightly underpowered.

SPECIAL FEATURES
18.5in display
Intel Atom processor
160GB HDD

ViewSonic, purveyor of monitors and the odd TV, enters the PC market with the latest in a fast-growing market of low-powered panel PCs, the VPC100.

This form factor began with Apple's iMac and comparisons are inevitable, although their purposes are very different. Despite the fact they look gorgeous, iMacs are regularly used for powerful tasks like video editing and design work. Most panel PCs are low-powered affairs more like a household's second PC. If you want a hardcore, powerful panel PC then look away now (your only choices are HP's excellent TouchSmart and Dell's configurable Studio One). This, like ASUS's Eee Top, consists of a screen with netbook-level components built in.

The VPC100 looks good and it's not obvious that it's low-powered until you turn it on. The glossy black casing with silver trim looks classy and doesn't appear much different to a regular monitor. The screen is 18.5in with a 16:9 aspect ratio and 1,366 x 768 resolution. It comes with matching keyboard and mouse, although these feel cheap and plasticy.

Inside there's the obligatory Intel Atom processor. It's the standard 1.6GHz but this N270 variant does pack a bit more of a punch thanks to its support for HyperThreading. 1GB of RAM is included, the hard disk is a 160GB and the graphics come courtesy of Intel's low-end GMA 950 chip with 8MB integrated RAM. Forget about playing anything but the oldest games on this.

In terms of general performance it's fine for web browsing and office documents. Although it played YouTube videos it couldn't play the HQ versions. Just an ounce more power would have been great. It also struggles with any web sites based on excessive Flash.

The all-format DVD drive is in the side, and a webcam is integrated into the top. Speakers are integrated too and they are a definite step up from the usual. These ones (two 3W units) don't sport too much bass, but they get loud and punchy.

Connectivity isn't too extensive. There are two USB ports on the right, two more at the back along with Gigabit Ethernet and two audio jacks. The keyboard and mouse use PS/2 ports leaving all four USB sockets free. There's also 802.11b/g Wi-Fi built in and a card reader which supports xd/SD/MMC and Memory Sticks. So the important ones are all there.

The screen itself is bright, well lit, crisp and clear. Videos look good but it will struggle and stutter if the bit rate is too high.

It's three inches larger than ASUS's Eee Top, but looks better. However, it doesn't have its competitors' touchscreen controls, which are ideal for this type of computer. If that doesn't bother you and you just want a typing station, it will suit you well. However, we shouldn't be far off having similar machines based on Nvidia's excellent Tegra platform. These will use even less power, require smaller circuit boards and yet be happily able to play back HD video and surf any web site. At $899 the VPC100 still represents good value, but it would just be that much more useful with a bit more power. As such, we can't quite recommend it, but it is a good-looking choice for a potential second PC in the home.

Nick Ross

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Office
Real help tools.

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Centre Com Sphere i5 Basic

Basic, but plenty of grunt.

Centre Com
www.centrecom.com.au
$1,499

✔ Good all-rounder component choice; good warranty.

✖ A little skimpy on storage.

SPECIAL FEATURES
Core i5-750 CPU
Intel DP55KG mainboard
4GB system memory

Centre Com is a new name in the pages of *APC*. It runs a chain of retail and corporate computer services throughout Melbourne and has partnered with Intel for an early look Core i5 desktop solution.

The Sphere i5 Basic looks like a great deal. For $1,500, it's a solid general usage system. For a few extra dollars, an upgraded graphics card would see us with a very competent gaming system.

The Sphere i5 Basic is based on Intel's Core i5-750 CPU. This CPU model runs at 2.66GHz, with Turbo Boost functionality up to 3.2GHz. It's paired with the Intel Extreme DP55KG desktop board. This board includes support for four DDR3 1,600MHz DIMMS, a single 16x slot for graphics or two 8x with SLI or CrossFire support, eight SATA ports and on-board Bluetooth.

The CPU/mobo combo is populated with 2GB of Kingston RAM and a single Seagate Barracuda 7200.12 500GB hard disk. Though the RAM is adequate, the relatively small hard disk shows the system was built to a budget. Thankfully, corners haven't been cut on the PSU, with a 650W "Master" providing power for the system. An Nvidia 9600GT graphics card with 2GB RAM serves 3D duty and will be fine for casual gaming, though it will struggle with high graphics settings on newer titles. A DVD-RW and solid Cooler Master Centurion case rounds out the deal.

On the bench the Sphere i5 Basic posted some very respectable scores. With a PCMark Vantage score of 6,162, it's certainly got legs.

When it's all said and done, we have a solid, well-built and well-supported (12 months parts and five years labour RTB) all-rounder. Just be prepared to spend a little more on a quality monitor, keyboard and mouse.

Nick Race

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Buying a PC is smart.
Adding the right software is genius.
Office
Real life tools
Office2007.com.au

9/10

CPL Core i5 PC

They broke the mould with this one.

Computers & Parts Land
www.cpl.net.au
$1,710

✔ Good performance; Blu-ray; well built.

✖ A little noisy.

SPECIAL FEATURES
Core i5-750
ASUS GTX260 graphics
Blu-ray drive

When the specs of this machine came through on email, we were pretty surprised. That's a lot of hardware considering the price.

The Core i5 system sent from Computers & Parts Land (CPL) is built around the Core i5-750 processor. This processor runs at a stock speed of 2.66GHz, with Turbo Boost enabling some cores to speed up to 3.2GHz. The CPU is housed in an ASUS P7P55D (not the EVO, LE, Deluxe or Pro), which is more than adequate for most users. The board includes support for Core i5 and Core i7-800 series processors, and will physically fit two 16x graphics cards but only run the second in CrossFire or SLI at 4x. There's support for four DDR3 memory modules and six SATA 2.0 ports.

CPL has also squeezed in 4GB of Kingston DDR3 1,333MHz memory and a Western Digital 1TB Caviar Black hard disk drive. It's about what we expect for mid-range Core i5 systems, and all good so far. Where CPL really picked up its game is with the ASUS GTX260 graphics card with 896MB RAM. This is a gaming-class card, and, though not the fastest, is a great start even for pretty serious gamers.

Taking it even further, CPL included a Pioneer Blu-ray DVD+/-RW combo drive BDC-S02, something we still only see in high-end systems. The system also packs a 650W Thermaltake QFAN power supply and a D-Link Wi-Fi adaptor for good measure.The whole lot is built neatly in a Cooler Master Storm Scout case.

On the bench the CPL Core i5 system performed admirably. Clocking in at 6,709 in PCMark Vantage, it's easy to see where those extra dollars kick in.

This Core i5 system from CPL shows they have a great understanding of what it takes to put together a high-performance PC without breaking the bank.

Nick Race

SONY

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It's never been easier to make your own Hollywood-style movies. Introducing the new Sony Vegas™ Movie Studio 9 video editing lineup, with even more powerful tools for movie production, soundtrack creation, and DVD design. For home movies and slideshows to share with friends and family all the way up to full-on HD movie productions on Blu-ray Disc™, there is a Vegas Movie Studio solution for you. All three applications include DVD Architect™ Studio software for DVD authoring and burning, as well as built-in tools for online publishing to YouTube™ and ACIDplanet.com™. From script to screen, you can rely on Sony Vegas Movie Studio software to bring your creative visions to life.

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Vegas Movie Studio Platinum 8
November 2007

WINNER PC USER BEST VIDEO EDITING SUITE 2007

PC USER BEST BUY

7/10

Kaiser Baas PhotoMaker

Bring your photos into the 21st century.

Lako Pacific
www.lako.com.au
$129.95

Easy to use; 32- and 64-bit drivers.

Vignetting on slide scanning; no manual colour adjustment.

SPECIAL FEATURES
- Scan up to three slides at once
- Automatic brightness and colour
- Includes ArcSoft PhotoImpression

Many people now view their photos on their high-definition televisions, mobiles or iPods, which is fine for digital photographs but can be difficult if you have old slides or film negatives. The Kaiser Baas PhotoMaker solves this problem by making it easy to scan slides or 35mm negatives and turn them into digital images.

The PhotoMaker is a USB-powered device which simply plugs into your computer. Both 32- and 64-bit drivers are provided for Windows XP and Vista along with an electronic instruction manual and ArcSoft PhotoImpression software. Installation was straightforward, although the installer requires you to specify whether you are running the 32- or 64-bit version of Windows.

Vista had no problems detecting the device and installing the software, so within a few minutes we were ready to scan. Slides and negatives need to be placed inside a supplied carrier, which hold up to three slides or five negatives. The carrier is then inserted in the front of the PhotoMaker and you manually slide the carrier in and out to position the negatives or slides. Although the carrier is notched, you do need to carefully adjust the position of the slides to obtain the best scan.

As you position the slides or negatives, the PhotoMaker automatically sets brightness and colour, although you will need to manually adjust colour as the automatic settings are not that accurate. When you have the slide or negative in the best position, simply select transfer and the software scans and saves the image as a JPEG (for email or viewing) or a TIFF (for printing).

Our only criticism, apart from the automatic colour settings, is that the device tends to vignette slides, which means you can end up with images that have rounded corners and occasional black borders if the slides don't line up perfectly.

David Neiger

8/10

Thermaltake ISGC-300

Now with Socket 1156 support.

Anyware
www.thermaltake.com.au
$89

Extremely quiet; capable cooler; Socket 1156 support.

Quite wide; may not fit with all RAM modules.

SPECIAL FEATURES
- ISGC silent fan
- Copper base and heatpipes
- Socket 1156 support

One of the biggest challenges when putting together a new Core i5 system is finding a good cooler that works with the new socket. Thankfully, it's not radically different to the old Socket 775 design (a matter of mere millimetres), but it's not something you can force to get it to fit.

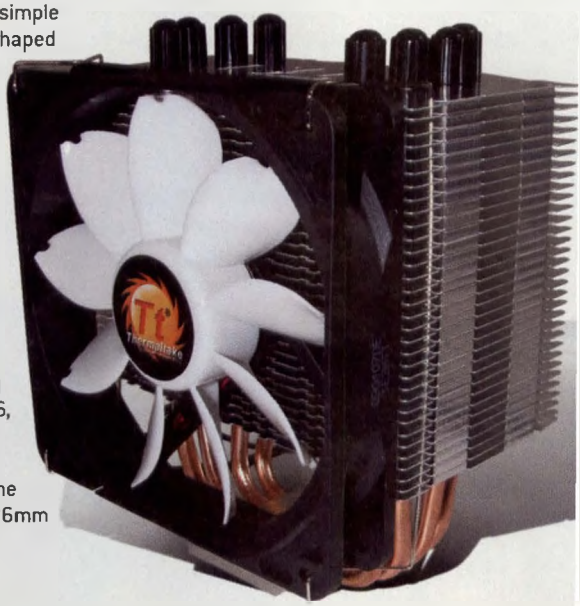
As the size and cooling requirements are so close, we're seeing a lot of older-model coolers being shipped with either adjustable mounts for the new socket or a new set of mounts thrown in the box. The ISGC-300 from Thermaltake is a prime example.

The cooler itself hasn't changed since its launch earlier this year, but what has changed is a set of mounting arms that screw into the side of the copper base with the new dimensions to fit the Socket 1156 design. Other vendors have indicated that similar solutions will be pending for their mid-range and flagship coolers as well.

Once the new mounting arms were screwed on, the ISGC-300 performed admirably. With a temperature under load of around 36C, there's plenty of head room for overclocking and Turbo Boost to kick in with this model. The design is a relatively simple copper base with four U shaped heatpipes holding an aluminium finned radiator. A 120mm ISGC 'spec' fan moves air through the fins. The fan can move up to 58.3CFM but it's damn near silent and will be well appreciated by those who value a quiet environment.

The ISGC-300 also ships with the necessary parts to cool Socket 1366, 775, AM3 and AM2/2+, so it's good for nearly everything out there at the moment. At 71 x 161 x 126mm (WHL), there's a concern it can overlap closely fitted memory slots, so get in there with a tape measure before you plonk down the cash.

Nick Race



7/10

ASUS HD 4890 Formula

Cooler than your average card.

ASUS
www.asus.com.au
$399

Great cooling; good overall performance. ✔

Soon to be made redundant with 5000 series. ✖

SPECIAL FEATURES
23% cooler
900MHz core overclock
1GB of GDDR5

For a long time ASUS has given us standard models and the TOP range, which carried with it some pretty impressive overclocked speeds. Now we've got the Republic of Gamers series, Dark Knight, Voltage Tweak, plus the Formula series. Each line-up has its own focus, with the main concept behind the Formula series being increased cooling capacity — in this case the promise is a 23% reduction in operating temperatures.

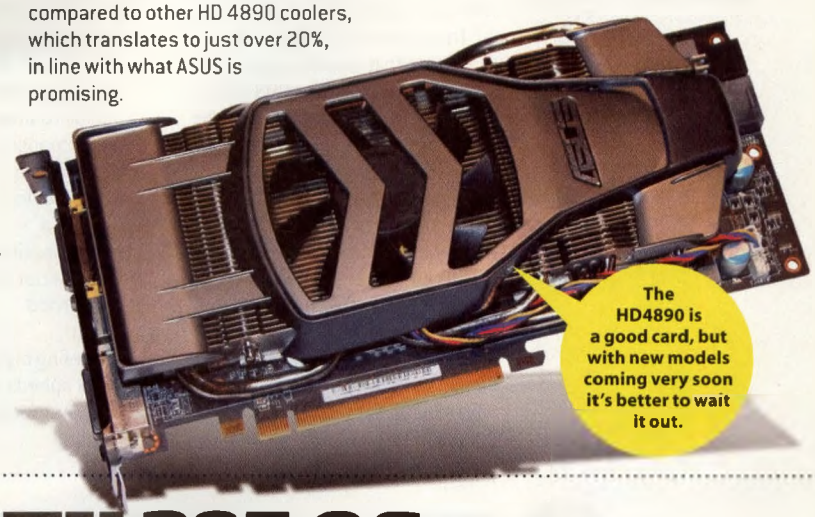
In the bundle ASUS has included all the expected cables, plus the ASUS-exclusive software, which includes programs like GamerOSD and Smart Doctor. Also included is the Voltage Tweak software that gives you the ability to adjust the voltage on the core of the card; with a stock cooler we've been able to achieve a core clock of 1,000MHz, which is promising.

With no mentions of increased clocks on the box — and the main focus being the cooling aspects — it was surprising to see that ASUS had bumped the core and memory clocks on this card: we've seen the core move from 850MHz to 900MHz, while the 1GB of GDDR5 moves from 3,900MHz QDR to 4,000MHz QDR.

Performance is slightly up from a stock HD 4890. Where the card really shines is in the cooling department. We're finding a drop of about 9 degrees compared to other HD 4890 coolers, which translates to just over 20%, in line with what ASUS is promising.

With new high-end ATI cards entering the market soon, we have to wonder about the value in the current crop of HD 4800 cards. If you can find a good price, it's a great HD 4890. The other option is to wait it out and see what the HD 5800 line up brings in both performance and price.

Shane Baxtor



9/10

Galaxy GTX 295 OC

Faster and cooler: win-win!

GalaxyTech
www.galaxytech.com
$749

Great performance; pre-overclocked; new single PCB design. ✔

Bare bundle; native HDMI gone. ✖

SPECIAL FEATURES
1,792MB GDDR3 at 2,200MHz
New single PCB design
Overclocked

APC MAGAZINE apc EDITOR'S CHOICE

We haven't seen companies do much outside the square with the dual-GPU designs from Nvidia, due to the complex dual-PCB design. But with Nvidia moving the GTX 295 to a brand-new single-PCB layout we've seen companies jump at the chance to mix it up. So if you've got the money there's no doubt that the GTX 295 series is the graphics card you want sitting in your PCI Express slots.

Looking at the card the fan has moved to the middle to help cool directly over the top of the GPUs, resulting in a 10 degree drop in core temperatures. The single PCB means that there have been slight changes with the layout, like the power connectors now being next to each other. Something else that has changed is the decision to drop the native HDMI port — Galaxy has included a DVI-to-HDMI connector in the bundle.

While the new single-PCB design carries with it the same default clock speeds as the previous design, Galaxy has given us more than just a slight bump. We've seen it move the core speeds from 576MHz to 650MHz, the shader from 1,242MHz to 1,401MHz and the 1,792MB of GDDR3 from 1,990MHz DDR to 2,200MHz DDR.

The increase in clocks speeds gives us a healthy boost in performance, while the GTX 295 already gives us the ability to play games at 2,560 x 1,600 with anti-aliasing, and we're able to increase the anti-aliasing and anisotropic filtering even higher for better-looking games with the new speeds on offer.

While the Galaxy GTX 295 might be lacking in the bundle department with only the essentials packed in, when you slot this graphics card into your computer and fire up your favourite game, the only thing you're going to be caring about is the graphics card and just how fast it is.

Shane Baxtor

9/10

G.Skill PC3-16000 Ripjaws

A solid kit for a Core i5 setup.

G.Skill
www.gskill.com
$149

Aggressive pricing; high clock speeds. ✔

Relaxed timings. ✖

SPECIAL FEATURES *i*

4GB dual-channel DDR3 Kit
Runs at up to 2,000MHz
Perfect for Core i5

APC MAGAZINE apc EDITOR'S CHOICE

Since the release of X58 last year we've seen many companies turn their focus to triple-channel memory kits, with the main target being 6GB packages. The problem with the X58 platform though is its cost. While motherboards start quite low, the i7 920 is far from a cheap CPU. While it does offer excellent performance it really is only for people with a lot of cash to burn.

The new P55 platform has brought with it a new setup of memory, dual-channel DDR3. One of the first companies to jump on the bandwagon is G.Skill, with its Ripjaws series. Consisting mainly of 4GB kits, the range starts at 1,066MHz and goes all the way up to 2,000MHz, which is the kit we reviewed.

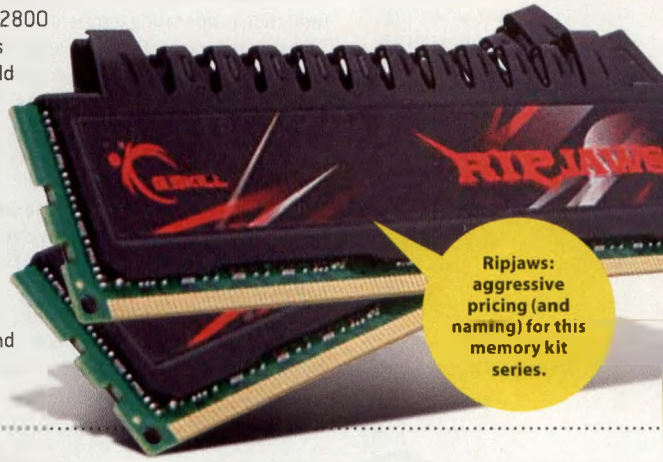
With 9-9-9-27 timings at a 1.65v setup, the kit is hardly the most aggressive we've seen. What these relaxed memory timings do is help keep the price down — which is the whole focus behind P55 and Intel's Core i5 CPU.

Installed in our Core i7 testbed, we found it's a kit that puts out lower numbers in the synthetic world when compared to its triple-channel counterparts. When it comes to real-world testing though the difference between the two configurations is a lot less noticeable.

If PC3-16000 is a bit excessive for your new P55 setup, you can save some money and move down to a PC3-10666 or PC3-12800 kit, which offers similar real-world performance at a cheaper price. Moving down is a perfect option if you're not too concerned about achieving high clock speeds and want a smooth-running system at stock speeds.

With aggressive pricing and a large range of speeds available, the Ripjaws series will more than likely have a kit that will suit your new system. If the 2,000MHz kit we have here is anything to go by, the G.Skill's Ripjaws series looks like a solid option for a new Core i5 system.

Shane Baxter



Ripjaws: aggressive pricing (and naming) for this memory kit series.

8/10

Thecus N5500

Performs well (if you don't mind the noise).

Thecus
www.thecus.com
$1,200 plus disks

Dual DOMs; improved UI. ✔

Noisy. ✖

SPECIAL FEATURES *i*

Dual Gigabit Ethernet
Dual Disk on Module
RAID 0, 1, 5, 6, 10 & JBOD support

APC MAGAZINE apc HIGHLY RECOMMENDED

Thecus continues to add features and boost the performance of its NAS units. The new N5500 is a 5-bay NAS that supports a broad range of RAID configurations and can be used seamlessly in mixed LANs with Windows, Mac and Linux clients.

The browser-based UI has been given the AJAX treatment. Configuration options are set out logically and the interface is easy to navigate. We did the initial setup by browsing to the device's IP address, but for less experienced users there's a wizard on the accompanying CD.

Every NAS is really a computer. Its operating system resides on a Disk on Module, or DOM. If the DOM fails the NAS is dead and your data may be at risk. The N5500 boasts dual DOMs — if one fails, the second automatically swoops in to save the day.

Connected to our gigabit test LAN we put the N5500 through its paces. We added a folder to RAID 5 array and copied a 480MB file package to and from the N5500. Copying to the N5500 took just 10 seconds — that's on a par with locally connected FireWire 800 drives. The return trip was a second faster, making this one fast unit.

Our only criticism is that the N5500 is noisy. However, it takes some serious fans to keep five disks, a Celeron M 1.86GHz processor and 1GB of DDR2 memory cool.

In addition to support for RAID 0, 1, 5, 6, 10 and JBOD, the N5500 can be used as a web, FTP or media server. It supports up to five 2TB disks and you can aggregate multiple N5500s so that they can be controlled as a single system. File system and protocol support is broad and the unit has dual gigabit interfaces that can be aggregated for increased performance or redundancy.

The N5500 is a great NAS — just don't sit it next to you on the desk.

Anthony Caruana

8/10

Silverstone Raven 2

A new spin on motherboard mounting.

Altech
www.silverstontek.com
$249

Interesting design; 2.5in SSD mounting; nice finish.

Almost 13kg: steel is *so* 2003.

SPECIAL FEATURES
Three 180mm fans
90-degree motherboard rotation
Plenty of storage space

APC MAGAZINE HIGHLY RECOMMENDED

The Raven 2 (RV02) from Silverstone is a big, spacious full-tower case made for enthusiasts, and it shows. The case measures 212 x 503 x 643mm (WHD), and while smaller than the original Raven, is still on the big side of huge. Definitely an under-the-desk model. The chassis can fit an epic amount of kit inside. With space for 8 x 5.25in hard disk drives (or 5 with the 3.5in cage installed) it's not lacking for storage space. Interestingly, it's one of the first cases we've seen that has a dedicated 2.5in bay for mounting SSDs. It's refreshing, and shows that Silverstone know its target audience.

For cooling, there's a single 120mm fan in the top of the case, plus three huge 180mm fans in the bottom for air intake. That's enough breeze to cool a V8, let alone a Phenom. Internal design also sees room for full-length EATX motherboards, and squeezing in multiple long graphics cards won't be an issue either. Silverstone have added an additional PCI bay at the top of the case, for a total of eight, to allow the user to go for a quad-graphics card setup if so desired.

Of course, the big difference is the motherboard is mounted 90 degrees left, with the traditional rear (including the PCI bays and backplate) toward the top of the case. All the external cables, like keyboard, mouse power and DVI are fed through the top of the case. Theoretically this should mean better cooling and easier access to cables.

Finishes and edges are all smooth or rolled, and cable routing looks well designed. There's a cutout behind the motherboard tray for easy fitting of a screw-on CPU cooler. Aesthetically, it's in the black monolith school of design. Matte black means no fingerprints, and it has a pleasing, menacing appeal. The case has been painted both inside and out, so if you're a side window kind of PC builder, it'll look its best.

Nick Race

Big and black: the Raven 2 is definitely the kind of case for *under* your desk.

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M911APC

7/10

NetComm Turbo 7 Wireless

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www.netcomm.com.au
$529

Easy setup; wireless range. ✔

802.11g only. ✖

SPECIAL FEATURES
802.11g connectivity
Next G Wireless internet sharing
Secure Wi-Fi out of the box

If you're one of the increasing portion of the population that moves house regularly then you know what a pain provisioning an ADSL or cable internet service can be. NetComm, in partnership with Telstra, delivers a router that uses Telstra's Next G network to deliver a portable internet connection. The Turbo 7 Wireless Gateway looks great, is solidly made and is a snap to set up.

Rather than the usual setup CD, the Turbo 7 delivers its installation files on a USB stick. The process is very straightforward with well illustrated, plain English instructions. It took about 10 minutes to set up a connection to the Next G network that was shared over wireless. We were very pleased that the WLAN was already secured when we started. Every Turbo 7 ships with a card detailing the wireless network name and a unique WPA key that can be changed.

The Turbo 7 is all about sharing a Next G internet connection over 802.11g. On this score it does a fine job. Wireless range was spectacular. We walked about 35 metres from the office and our connection back to the Turbo 7 didn't miss a beat, with ping results showing that connection latency was barely impacted. The lack of 802.11n is a significant omission, although it's not likely to impact internet access much as the connection bottleneck is more likely to come from Next G.

Users of file-sync services like DropBox may find upload speeds over Next G are a serious issue (and with other services that rely on solid upstream connectivity).

If you need a portable internet service that can be easily shared, then you could do a lot worse than NetComm's effort here.

Anthony Caruana

7/10

Belkin N+ Wireless

Well-equipped (if not the 'Best').

Belkin
www.belkin.com.au
$249

Easy setup; disk sharing; performance. ✔

No printer sharing. ✖

SPECIAL FEATURES
Dual-band wireless
USB storage sharing
Gigabit Ethernet switch

Belkin takes a novel approach when grading its routers. It has adopted a Good, Better and Best ranking. The N+ Wireless Router and its stablemate, the N+ Wireless Modem Router, sit in the Better group. With four Gigabit Ethernet ports, dual-band 802.11n and a USB 2.0 port for sharing storage, it's a well-equipped home or small office router.

The accompanying CD includes an application that makes setup simple. From unpacking to operation took just ten minutes, although the setup program requires and configures an internet connection before the wireless is secured. Other settings like wireless security and sharing a storage device connected to the N+'s USB port can be configured using wizards, although there's also a browser-based utility.

Wired performance was excellent. We were able to move a 480MB file package around in about 19 seconds over Gigabit Ethernet between our test systems. That's about 10% better than USB 2.0 in our testing.

Wireless range was very good, although not as spectacular as wired. The N+ maintained a solid connection at 25 metres, although we did miss a lot of packets in the ping test when a solid brick wall was introduced between the notebook and router. However, that's typical of most routers. The dual-band radios mean it's possible to run two WLANs simultaneously — one for locals and a separate one for visitors.

The USB port made it very easy to share a hard drive or USB stick. If your budget is too tight for a NAS then this is a decent half-way house. However, the port is limited to hard drive sharing, so you'll need some other solution for printer sharing.

There's plenty to like about the Belkin N+ Wireless Router. Setup and performance were excellent and the ability to share storage over a LAN is very useful.

Anthony Caruana

9/10

Wacom Bamboo Pen & Touch

A PC tablet for the masses.

Wacom
www.wacom.com
$159

Simple and easy to use; great value; versatile.

Takes getting used to.

SPECIAL FEATURES
Large working area
USB plug-and-go
Heaps of bundled software

APC MAGAZINE apc EDITOR'S CHOICE

If Wacom had its way, the days of the mouse would be numbered. A new range of reasonably priced Bamboo tablets allows anyone with a PC to get hands-on with its software. As the name suggests, the Bamboo Pen & Touch features both stylus pen and trackpad for input. The trackpad aims to bring iPhone-style finger navigation to your PC by discarding the mouse in place of familiar finger movements. You can drag files, rotate images, double-click on files by tapping the screen twice as well as scroll up, down, backwards and forwards over web pages with great accuracy and speed. With a tap of two fingers simultaneously, the right-click menu can be accessed. In short, the Touch component does everything you can do with your mouse (without the RSI).

The addition of a traditional tablet pen adds even more functionality, as it can be used to sign, alter and annotate Word and Excel 2007 documents as if you were marking up a printed page. For those of you with interests in art, the Pen is a great graphics tool that allows for more freedom for getting creative in most popular imaging software. You can sketch on screen as you would on paper in order to draw artworks straight into Paint Shop or you can fine-tune your graphics skills by performing more intricate image touch-up work in Adobe's Photoshop.

Wacom has added value to the Bamboo with the inclusion of Adobe's Photoshop Elements and the illustration program Ink-Squared Deluxe. If you want to free up the way you work or create artwork on your computer, the Bamboo Pen & Touch will go a long way in making your digital life a whole lot simpler... and entertaining.

Christopher Zammit

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8/10

Epson Stylus TX550W

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Epson
www.epson.com.au
$159

✔ Quiet; overall good price/performance.

✖ No ADF or duplexer.

SPECIAL FEATURES
Front card and USB connectors
Ethernet and Wi-Fi

Epson has released an affordable, capable and attractive MFD.

Setup and software installation are straightforward. There's no need for a temporary USB connection to prepare for network use (good), and in any case Epson has avoided the arrangement whereby the cable snakes around under the covers (even better). Wireless setup was smooth and easy, and the internal power supply is another plus.

Epson provides AABBYY FineReader 6.0 OCR software along with the necessary drivers and utilities. As usual, the TX550W can be used independently to print from USB storage devices, PictBridge cameras, and memory cards.

The LCD panel is on the small side at 2.5in, but being bright and sharp it's easy enough to use. Superimposing text over thumbnail images seems odd initially, but compensates for the limited space and works surprisingly well. There's also the option of printing and then scanning an index sheet from a storage device to automatically print the desired selection.

The results from our copying test were impressive. Details reproduced well, and the colour matching was generally very good, although some mid blues were closer to cyan. It'll do the job for most purposes. Scanner output was also good. The software does a fine job of separating multiple images from a single scan, and we remain impressed by Epson's colour restoration feature.

As for printing, the first page of our business document dropped in 37 seconds and the second in 27 seconds. Text was sharp and dense, and comparable with models that we've tested from the $500 bracket. The colours, especially reds, were slightly subdued in the graphic elements, but that's not necessarily a bad thing.

Photo printing took 3 mins, 4 secs, and the quality was good though not great. The girls in our 'lollipop' test image had natural-looking faces without the excessively red tones that often mar this photo. If we were in the market for a modestly priced 'all-round' home network MFD, the TX550W would make the shortlist.

Stephen Withers

7/10

Kyocera Mita FS-1128MFP

True multi-functionality.

Kyocera Mita
www.kyoceramita.com.au
$1,538

✔ Scan to or print from USB storage; printed documentation; startup.

✖ No client for network scanning.

SPECIAL FEATURES
Front connector for USB Ethernet
Simultaneous tasks

Intended for workgroup use, the FS-1128MFP is an A4 mono laser printer, fax and colour scanner with USB and 10/100 Ethernet interfaces. When first set up it takes about a quarter of an hour for the toner cartridge to charge the printing mechanism, but from then on the FS-1128MFP is ready to go within 15 seconds of switching on.

Software is basic: a choice of full-function or mini-drivers, plus a fax driver, screen fonts and a couple of utilities. PaperPort SE 11 is provided on a separate CD. The FS-1128MFP is exceptional in that it comes with full printed documentation in three volumes plus a quick-reference booklet. There's a web UI augmenting the front panel for more convenient admin, for example, to control access or set up job accounting.

Our business document test saw first page out in 10 seconds, with page two dropping after another 2 seconds, consistent with the claimed 28ppm. The text was everything we expect from a laser, but coloured areas appeared darker than usual so a gradient that's normally apparent on mono output was almost solid black. An all-black page printed with a smooth charcoal-grey finish, only slight banding, and margins varying from 3 to 6mm.

Scans can be sent across a network via email or to SMB or FTP servers. Some will find it simpler to scan to a thumb drive, and take that to their PC. The FS-1128MFP scans to PDF, TIFF, XPS or JPEG. The fax side works as expected and the network fax driver is straightforward. Incoming faxes can be forwarded to a particular computer via SMB or FTP, or to an email account.

Copying is flexible, with the ability to collate and duplex multi-page copies. Rather than have you wait for a long copy job, the device can send an email when it's done. And, the FS-1128MFP is a *true* MFD: it can copy a document *while* receiving a fax.

Stephen Withers

7/10

Sony Bravia KDL40WE5

Otherwise known as an off button.

Sony
www.sony.com.au
$3,299

Great all-round picture quality; natural colours; good upscaling. ✔

Modest blacks. ✖

SPECIAL FEATURES *i*
Hot Cathode tubes
Eco mode
Motion sensor

Sony's WE5 is its Eco TV. It's similar to Sony's W-series base model, but with extra power-saving features, greener construction and a $300 price hike. It comes in two flavours — a $3,799 46-incher and our review unit, a $3,299 40-incher.

The greenness comes mainly from the backlighting. LCDs usually use CCF tubes to shine light through the LCD layer. Sony's model uses Hot Cathode tubes (as you'd find in office lighting). These shine brighter so you need fewer. The energy saving is around 40%. The TV is also lead-free.

There's a motion sensor which will turn off the screen (leaving the sound on) if it detects a room is empty. But the impressive-sounding "Energy Saving Switch" turns out to be an "off" button. "Eco Mode", reduces the backlight power even further.

We wonder why all Sony's LCDs don't use these basic technologies, but then we also wonder why the company doesn't use LED side-lighting more either — this uses even less power. Sony likes to keep features like 200MHz MotionFlow, LED backlighting, and green construction separate across ranges rather than make an ultimate TV with all features at once.

It's a smart-looking TV. The glossy black bezel and silver "floating" speaker grille at the bottom (connected via an "invisible" Perspex layer) make it look good. At 17.4kg it's also relatively light.

The simple remote and PS3-style "XrossMediaBar" on-screen menu make it simple to use. An Ethernet port allows DLNA networking and a port for USB storage all help make it a great digital picture frame.

Turning on Game Mode brightens the screen and removes HD lag, which affects games like Guitar Hero.

Watching top-quality Blu-ray movies at 1080/24p was a joy. The MotionFlow technology worked well at smoothing movements (although the very occasional aberration was still evident when it was caught off guard, due to buffering issues). Movies could look a little too realistic (characters looked more like actors on set — destroying dramatic impact) but a quick press of the 'Theatre' button fixed this. Colours were good, detail superb but contrast was a mixed bag. In most scenes detail was good in light and dark areas, however, darker scenes could turn black too soon and detail was lost. Also, as with most LCDs, the backlight washed out blacks meaning that letterbox bars could look a bit bright and distracting in a dark room.

It's great for TV, both in SD and HD, with good, natural colours and decent motion handling. Extensive settings are available for those who like to tinker too. HD TV is super sharp while SD TV is brilliantly upscaled, with minimal jaggies and aberrations. Detail is preserved well too, without making everything too soft. Sound is well rounded and gets loud and punchy.

The HQV quality benchmark showed the WE5's Bravia 3 engine to be the best image processor on the market. It aced all of the tests, happily dealing with one-pixel fine lines in motion, jaggies on moving objects and was excellent at noise reduction.

Elsewhere, Kogan's ugly 46-incher costs half the price, albeit with inferior image quality, while the slimmer, sexier, Samsung 7-series 40-incher costs $3,899. Power-hungry plasmas offer more inches for the money but, for image quality alone, we recommend the WE5. The power-saving guff is the icing on the cake.

Nick Ross

Built with genuine Windows Vista® Home Premium
FREE WINDOWS INSTALLATION!
XGAMER
Windows Vista Home Premium
Microsoft
Buy any Microsoft Windows Vista or XP with any XGamer system and we will install it for FREE!
WWW.GAMEDUDE.COM.AU
PH: 3387 1500 - ADDRESS: 3353 PACIFIC HWY, SPRINGWOOD, QLD, 4127

6/10

Kogan Wi-Fi Digital Radio

Audio quality leaves a lot to be desired.

Kogan
www.kogan.com.au
$199

Access to internet radio; music streaming from PC; iPod dock. ✔

No remote control; mediocre sound quality; ugly. ✖

SPECIAL FEATURES
Full DAB+ and FM support
Wi-Fi enabled

The Kogan Wi-Fi Digital Radio has all the features of our current reigning favourite, the Revo iBLik radio station, for less than half the price. As with the company's other products, Kogan accomplishes this feat by building it as cheaply as possible. The plainly named Wi-Fi Digital Radio is far from a good-looking machine, and it looks and feels just as cheap as its pricetag suggests.

If you're not fussed with looks and build quality, however, there's a lot to recommend the Wi-Fi Digital Radio to cost-conscious buyers. Like all DAB+ devices, it offers DAB+ and FM tuners for receiving free-to-air radio broadcasts, and it's also tricked out with an iPod dock, USB port and 802.11b/g Wi-Fi for streaming internet radio stations and music stored on computers on your network.

Using the Wi-Fi Digital Radio is straightforward: there are two knobs on the front for adjusting volume and scrolling through the radio stations and menu options, a two-line blue-backlit screen that displays scrolling text on the second line, and buttons for accessing the station presets, flicking between the different modes and turning on the alarm. We were able to get it hooked up to our WPA-encrypted wireless network with no dramas, and it's easy enough to navigate through the system.

As with the Revo iBLik, you can add custom radio stations and organise favourites from an online portal. If you're hoping to stream your iTunes library to the Kogan you're out of luck, though — it only supports Real Audio, MP3 and WMA files.

Common for this type of system is a remote control for accessing all the different functions from afar, but the Kogan doesn't come with one. Another compromise is the system's audio quality, which is about on par with what you'd get with a cheap desk radio. Thankfully, the speaker doesn't distort at maximum volume, as it's a setting you're likely to have it on permanently — the total volume output is weak for the radio's size. There aren't any options for adjusting audio levels or the EQ, and the bass is practically non-existent.

Jenneth Orantia

9/10

LG BD390 Blu-ray player

Close to perfection.

LG
www.lge.com.au
$749

Built-in wireless network; DLNA and Media Center-compliant. ✔

DVD region-locked. ✖

SPECIAL FEATURES
Blu-ray Live-compatible
Supports multiple file formats
1GB RAM

APC MAGAZINE apc EDITOR'S CHOICE

The LG BD390 is definitely one with the lot, and if you can find the extra cash for this unit, you won't be disappointed. Setup is a dream and the LG menu system is fast and easy to navigate. No need for the manual!

Earlier LG units had poor picture quality but with the BD390 there is nothing to complain about. The picture is crystal clear and passed all of the tests on our Silicon Optix test disk.

It has all of the connectors you could ask for including 7.1 channel analogue outputs so you can enjoy 7.1 surround sound with a good set of powered speakers.

The player can handle just about any format of media including full high-definition DivX, AVI, QuickTime (MP4) and MKV containers on either optical or USB devices (memory keys and hard drives). Even if your media is not up to full 1080p standard, the upscaler does a very good job displaying DVDs at near Blu-ray quality.

As one would expect, the BD390 is Profile 2.0 (Blu-ray Live) compliant but, unlike some of the cheaper players, has the necessary 1GB of memory built in so you don't need to use a USB key to boost the memory.

The real reason to buy one though is that it is fully DLNA 1.5-compliant, which means it can stream photos, audio and video from any DLNA-compliant device and any PC running Windows Media. Video playback over the network was perfect with good upscaling of standard-definition content. If you prefer to go wireless, the BD390 also supports 802.11 b/g networking.

We had to struggle to find something to criticise, and the only drawback of this unit is that, like with all LG products we have tested, it is DVD region-locked — however, with such excellent media support, even this is not a problem if you know what you are doing. About as close to perfection in terms of functionality and quality as it gets in a consumer-grade DVD player. Great work LG!

David Neiger

6/10

Creative Vado HD

Small enough to fit in your pocket, but does it belong there?

Creative Labs
http://au.creative.com
$455

✔ Good imagery; inside HD spec; HDMI cable supplied.

✖ LCD dim when outside; silly implementation of tripod mount.

SPECIAL FEATURES
Tiny design
HDMI and USB
High-definition recording

A classic example of a product that could be good, if only a little more thought was put into it.

The trend lately in electronics is small. Notebooks have become netbooks, boom boxes became iPods — even the Kingswood became the Mini Cooper S. So it makes sense that cameras would also downsize.

The first hi-def camcorders were quite large compared to their miniature SD cousins; as time progressed though, even HD cameras became smaller and smaller — check out the JVC Everio range. This has pros and cons. The pros are that they can slip into your pocket or backpack ready for instant action. And in this day and age of everyone being an ENG (electronic news gatherer) potentially, this is very important. The downside is that they become hard to hold steady, battery life is compromised and inevitably, boo hiss, there is no viewfinder.

I'd like to say I enjoyed using the latest of the small HD camcorders, the Vado HD from Creative Pacific. But I can't. Here's why.

At one time Creative Pacific were on top of the world, owning the add-in sound card market for PCs, but since then, for some reason, in my opinion they have been playing catch up — even more so than Sony.

The Creative Zen MP3 player, of which I had two, was excellent, but then the iPod juggernaut pound it into dust. Now with the Vado, I fear the same will happen. There is just not the attention to detail needed to make it a winner.

The single biggest annoyance and one alone that simply would stop me buying one is the LCD screen. It's plenty big enough at 2in, but even on an overcast day outside, you cannot see it! As the REC indicator is on this screen, it becomes hit and miss as to whether you are recording, not to mention what level zoom you are at — and make sure the subject is in frame. The trap here of course is that when being demonstrated in a shop, this would not be at all evident.

Now this is a real shame, as the footage the Vado takes is excellent and the playback in the LCD is crisp, bright and sharp — indoors. The inbuilt audio is a tad tinny, but a good pair of earbuds (I used a top set of Sennheisers) would solve that.

By the way, even though it's called a Vado HD, don't be fooled into thinking the imagery is HD in the sense of the word you're used to with your plasma or LCD. It isn't; it's 1,280 x 720, which, although inside the HD spec, is not the same as your big plasma or LCD at 1,920 x 1,080 (although screen resolution is 640 x 240). Memory is 8GB — claimed to be two hours at HD quality and eight hours at VGA quality. Battery life they reckon is just over two hours, and recharging is via USB.

Zoom is a miserable 2x, so get used to walking up close to your subject — not necessarily a bad thing as zooms are overused anyway.

The other problem that is a deal-breaker is price. The US price is US$299.95 but Creative Singapore who run the show here tell me the Aussie pricing is $454.40 (but promotional for a "while" for $363.59 — both plus GST). $360 is about right at the current A$ level, so $450 is a bit steep.

Output ports are HDMI and USB but, on the plus side, an HDMI cable is supplied, as is a tripod mount, but even there someone didn't think it through, as the rubber grip to pull out the USB cable protrudes into the tripod mounting hole area, making it not sit flat when screwed on.

David Hague

The projector on this camera performs much better than the gimmick it sounds like it should be.

8/10

Nikon CoolPix S1000pj

Digital camera or digital projector? Both, actually.

Nikon
www.nikon.com.au
$699

Usable projector in a camera; not too bulky; good all-round camera. ✔

We'd love the projections to be brighter. ✖

SPECIAL FEATURES
Both camera and projector
LED lighting
Video record functionality

APC MAGAZINE HIGHLY RECOMMENDED apc

We got our hands on an early sample of Nikon's new compact, which amazingly sports an inbuilt projector. This immediately screamed gimmick. At the very least, first versions of off-the-wall products like this are dodgy in some way and take a few generations to become polished. But we struggled to find the flaws.

Internally, this is essentially the same camera as Nikon's new CoolPix S640. However, the lens is internal whereas the S640's extends from the body. Both have a 12-megapixel sensor and 5x optical zoom (equivalent of 140mm) which pulls back to a 28mm wide angle. The camera itself doesn't gain too much bulk through adding the projector.

At a glance, from the front, the S1000pj looks to be a regular camera with no lens cap. But then you realise that the lens is hidden behind a cover in the top corner and the middle 'lens' is for projection. Pressing the projector button sends a beam of light to whatever surface it's pointing at. The image can get up to 40 inches, which rivals HDTVs, but you need to be in a very dark room to see it at that size. Nonetheless, we were very impressed at the brightness which showed up well in relatively bright rooms.

A big potential problem with projectors is focus but this is solved brilliantly with a sliding switch at the top of the camera. This makes focusing virtually instantaneous. Another typical projector problem is the lamp. Normally, if these aren't treated with great care they can blow up and are expensive to repair. The S1000pj uses LED lighting, so it should last the life of the camera.

Because it mirrors Nikon's best compacts, it functions very well as a standalone camera too. The lens is sharp and image noise is low. Performance in low light is respectable and responsiveness from handling and focusing is impressive.

The menu system looks simplistic but offers powerful options. Special features include Smart Portrait mode with 'Smile Shutter', blink detection and skin softening. A subject tracking mode generally worked well, but could get confused when dealing with crowds or low-contrast backgrounds. D-Lighting helps avoid major contrast issues and the Best Shot Selector takes several shots and picks the sharpest. There aren't however, any manual modes you can pick from.

Scene mode is easily accessible and includes settings for all the usual lighting conditions. It also offers a Panorama Stitch assist, which works in any direction. However, the stitching takes place on a computer and not the camera itself. If you like this feature, though, note that a new plug-in for Windows 7 does a better job than any camera on the market and doesn't require you to precisely line up previous shots on the small camera screen.

Video at 640 x 480 isn't as high as elsewhere: competitors are now offering 720p, which looks good on big TVs via video out ports (absent on the S1000pj). While the S1000pj's movie playback looks good, the sound through the miniscule mono speaker can't quite rival a monster home theatre system. So don't throw away your TV just yet.

Battery life, even with a liberal use of the projector, is good, and everyone we showed slideshows and movies to was very impressed.

Overall, while it's no replacement for a proper projector, it's a decent point-and-click snapper with a useful feature that's guaranteed to break the ice at parties. It comes with a projector stand and remote but we were unable to test these.

Nick Ross

9/10

Mac OS X 10.6

Snow Leopard makes a smart upgrade.

Apple
www.apple.com.au
$39

Improved performance; Exchange 2007 compatibility. ✔

Apps will need upgrading to take full advantage of speed boost. ✖

SPECIAL FEATURES *i*

Most inbuilt apps are 64-bit
Optimisations for multicore chips
First appearance of OpenCL

Apple's latest operating system has more in common with Windows 7 than Mac fans may care to admit.

Like its northern *bete noire* from Redmond, Mac OS X 10.6 Snow Leopard is less about dazzling new features than consolidating the platform. But whereas Microsoft has to regain the ground and credibility lost by Vista, Apple's focus is to introduce new technologies that will continue to drive the OS ahead.

Most crucial is Grand Central Dispatch (GCD), which taps into the multicore processors found in Macs.

Baking GCD into the OS itself Apple not only enhances Snow Leopard's native performance, it also opens up the means for third-party software to more easily use multithreading and multicore operations. Instead of calling out each threaded task in a program, developers need only to break the data into self-contained 'threadable' blocks, which are handed over to GCD for allocation.

Another advance is the debut of OpenCL, which is a non-graphics version of OpenGL created by Apple but now made available as an open standard framework backed by AMD, Intel and Nvidia.

Snow Leopard already uses OpenCL to leverage the processing power of each Mac's GPU for general computing beyond gaming and 3D software. As with GCD, however, the intent is for third-party programmers to adopt OpenCL as the means to give their own apps a significant speed boost.

Apple has also rewritten much of OS X as a 64-bit OS, including the Finder and the major inbuilt apps such as the Safari browser, although unlike Windows the OS can simultaneously run in 32-bit and 64-bit modes.

The kernel still launches in 32-bit mode to support 32-bit apps and drivers, but 64-bit programs run in their native full throttle mode. Apps that have a mixed heritage will be automatically started or relaunched in 32-bit mode.

The performance results of the extensive architectural overhaul are immediately apparent. Apps open noticeably faster, and the system is much more responsive when switching between programs.

Using Apple's iDVD app to create a DVD image involving several video clips, menus and effects took 28 minutes in Snow Leopard compared to 46 minutes in OS X 10.5 Leopard.

But not all multimedia tasks show such a speed-up. Converting an AVI file into a QuickTime movie or an iPhone-compatible M4V clip are the same.

Perhaps the biggest challenge for Apple has been partnering these under-the-hood enhancements to a slew of more obvious improvements to please the punters.

The standout is QuickTime X, the new multimedia player, which boasts features previously restricted to Apple's $45 QuickTime Pro upgrade.

A revamped UI puts an emphasis on streamlined style, with a smokey translucent control pad, which disappears when you move the mouse pointer out of the window.

The player can record on-screen video and audio through the microphone, for cooking up quick video tutorials, along with Webcam video.

Pared-down export options simplify the process of saving clips for iPhone, iPod and Apple TV as well as direct uploading to YouTube and adding to your iTunes Library. Rudimentary 'trim' controls can be used to edit a clip down to a desired running time or remove everything but a particular scene.

MacBook owners who work in a Microsoft-based office will welcome the ability to use Mail, iCal and the Address Book as full Exchange 2007 clients. These are a superior solution to Microsoft's bloated and bulky Entourage, and could fuel demand for the promised Outlook for Mac, which will be included in Office 2011.

Other changes fall more into the realm of creature comforts. The menu bar's AirPort icon reports on the signal strength and security status of nearby wireless networks.

All Apple notebooks with multi-touch trackpads now enjoy the full complement of gestures, including a four-finger swipe to switch programs and invoke the Expose view of all open windows. You can also summon an Expose view of any application through a long click on its Dock icon, and dive deeper into the contents of a 'stack' folder without opening a separate folder window.

If Apple had retained the $159 price tag of OS X 10.5, upgrading to Snow Leopard would be a big ask. But at Apple's strategic and sensible $39, it's a no-brainer.

David Flynn

Under-the-hood changes, along with surface updates makes Snow Leopard one to consider.

Windows 7

Launching this month, we've reviewed the key elements of Win 7 that should consign other Windows OSs to the bin.

Microsoft
www.microsoft.com.au
See page 67

Outperforms Vista across the board; slick interface and usability.

XP mode should have been in every version.

SPECIAL FEATURES
Runs on average hardware
Multi-touch capable
Faster than Vista and XP

Windows 7 is the first time that Microsoft has promised a new version of Windows that will run better than its predecessor on the same hardware.

In fact, Windows 7 runs happily on PCs that you'd never have considered using with Vista, including Atom-based netbooks — the OS's 1GHz processor and 1GB of RAM minimum specification was almost certainly designed to include them. Windows 7 is also more frank about rating hardware, and grades performance much more harshly: a Toshiba M200 tablet that scored 2.0 under Vista is now rated at 1.0 because of its poor graphics performance.

PERFORMANCE

In our tests, Windows 7 beat both Vista and XP on startup and shutdown, file copy times and general performance. It was also faster than the release candidate version, whose raw performance figures weren't that dissimilar to Vista SP2 (though it felt far more responsive in general use).

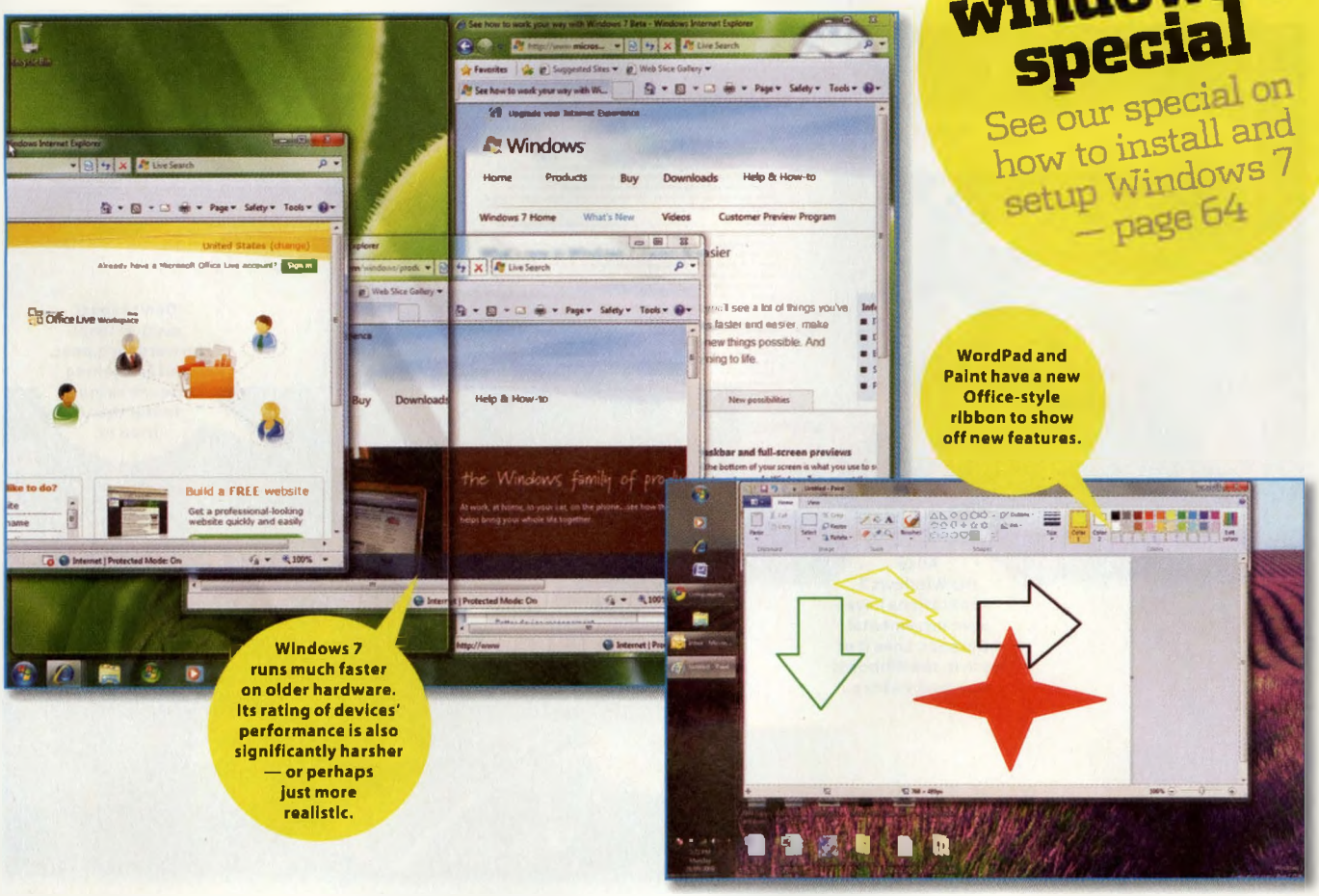
On a system with a fast SSD like the ASUS S101 notebook, Windows 7 wakes from sleep in under three seconds and resumes from hibernation in 17 seconds (nearly half the time that XP takes); it's 10 seconds faster to boot and five seconds faster to hibernate. With a standard hard drive, the advantage over Vista is dramatic for boot time (down from one minute 20 seconds to 45 seconds on a Dell XPS M1330 and from two minutes 45 seconds to 58 seconds on a Toshiba M200). Hibernation is even faster.

On quicker systems, speeds for shutting down and resuming from hibernation only improve by a second or two, but shut-down time on the M200 improved from 54 seconds with the original version of Vista to 36 seconds. If you want to keep fast boot times, though, you'll need to keep an eye on what's starting up.

For example, an OEM health tool bumped the 58-second boot time up to one minute 38 seconds.

File copying is twice as fast as XP and three times as fast as Vista when you're doing it with several megabytes of files. When you copy much larger files (3 to 5GB) that reach the limits of the disk buffer, the improvement is slightly less, but a file copy that takes five minutes in XP takes four in Windows 7 (we saw 10 to 20 per cent improvement on different systems). With artificial benchmarks like PCMark and Sandra, Windows 7 equals or beats Vista (with or without SP2) on every test we threw its way.

Windows 7 feels more sprightly than Vista or XP in general use because code for dozens of common tasks have been rewritten. Search is fast, windows open quickly and you're not left tapping your fingers the way you were with Vista. The Desktop Window Manager uses far less memory (as long as you have WDDM 1.1 drivers). Windows 7's practice of only loading services actually in use improves performance, and services also get unloaded when they're not needed. The smaller page file leaves more virtual memory for applications, Registry use takes fewer disk accesses and getting the timers used to allocate resources better aligned will speed up Windows and


windows 7 special
See our special on how to install and setup Windows 7 — page 64
WordPad and Paint have a new Office-style ribbon to show off new features.
Windows 7 runs much faster on older hardware. Its rating of devices' performance is also significantly harsher — or perhaps just more realistic.

any programs opting into this in the future.

INTERFACE

Beyond benchmarks, some of Windows 7's speedy feel is down to its more efficient interface, which makes it faster to find, manage and work with windows and documents. The Windows interface of old was cluttered and inefficient, with its desktop icons, Quick Launch icons, Start menu icons, system tray icons and open tabs on the taskbar. Some apps have all of them, and maybe a Sidebar gadget as well. That's a lot of unnecessary clutter.

As well as looking cleaner and more attractive, the new Windows 7 interface uses the features of Aero graphics to make your workflow more efficient. Pinning icons to the taskbar means that there's no need for a Quick Launch bar of tiny icons, and every icon gets a Jump List that you can pin favourites to. Jump Lists of common tasks show up in the Start menu as well as on the taskbar, so you can open your Outlook calendar or play all your music in Windows Media Player with a single click.

You can tell which apps are running, which have multiple windows open and even whether you're signed into Messenger or halfway through a file copy from the taskbar icons. Hover over an icon to get thumbnails of open windows, hover over the thumbnail to see that window, click the thumbnail to switch to the window — it's a logical and intuitive progression. Previewing the desktop with Aero Peek and snapping windows into place by dragging them into the corners makes it easy to arrange documents and web pages side by side (although we'd like to see this work better on multiple monitors).

APPLICATIONS

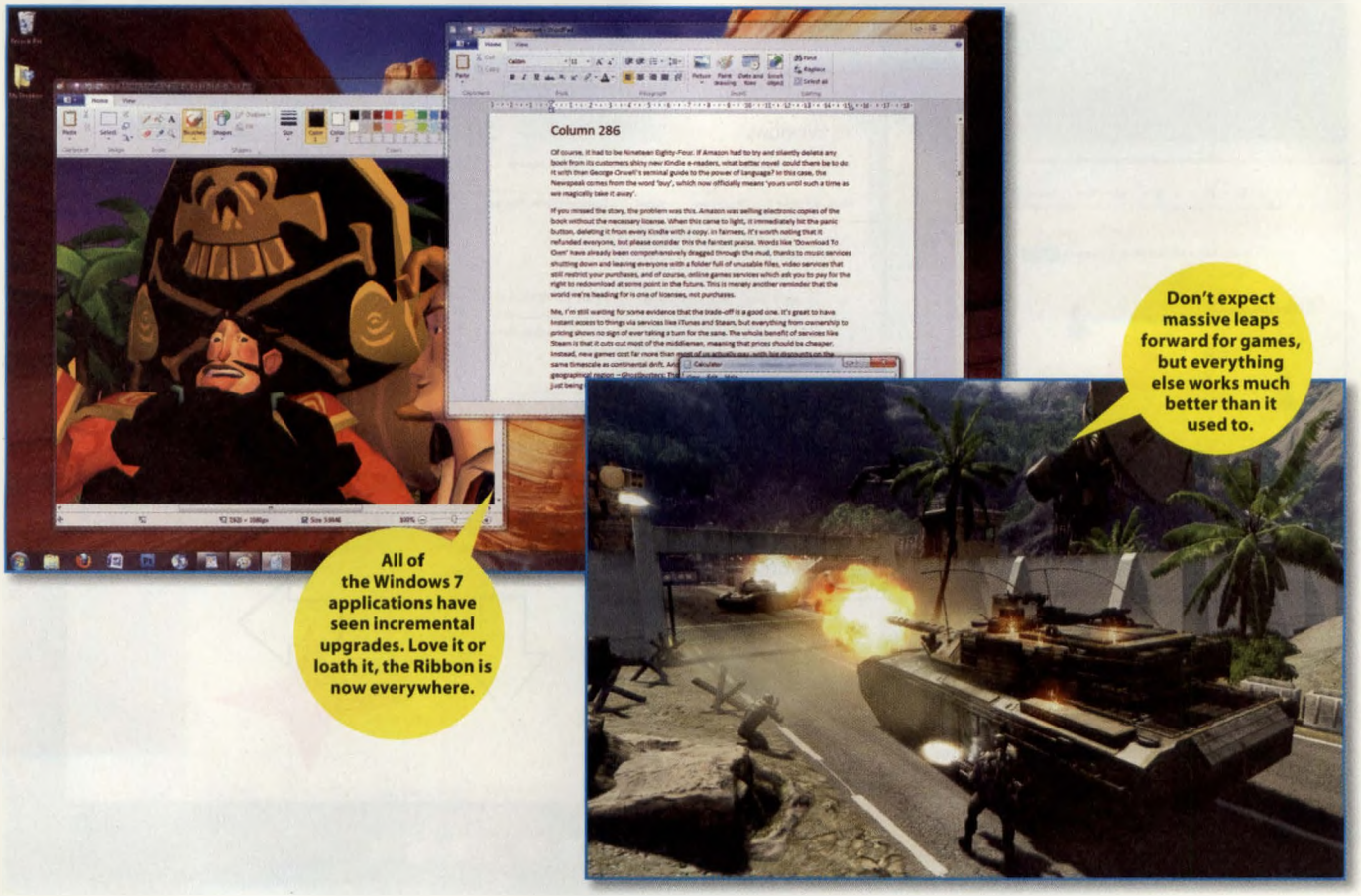
Apps like Windows Messenger, Mail and Movie Maker are now part of Windows Live and not shipped as part of Windows 7 directly. That leaves Calculator, WordPad, Paint and DVD Maker (which is now a wizard for burning DVDs).

WordPad and Paint have a new Office-style ribbon to show off new features. Paint gets a set of natural media brushes, multitouch gestures and transparency. WordPad is almost a word processor, with font, line spacing and picture tools. You can also open and save Office XML and ODF files, although some complex '.docx' features won't be rendered. Along with the scientific, statistical and programmer Calculator modes (which are useful for decoding dword entries from the Registry), there are also handy new tools you might actually use, like unit conversions.

SECURITY

Vista did the hard — and painful — work of improving security; Windows 7 can sit back and enjoy the benefits. Far fewer applications need to run as administrator after the flood of complaints generated by UAC, so Windows 7 can offer less-intrusive options. By popular demand, you'll always be prompted for changes to the level of UAC, which itself runs as a high-integrity process (so it's hard for malware to change settings), but you can choose between seeing notifications for all changes or just applications. This makes UAC less irritating, leaving it to do what it does best: protect you from malware targeting Internet Explorer. This should also stop developers expecting us all to be logged into our systems with an Administrator-level account.

Windows Firewall grew up in Vista too, but more powerful features weren't obvious. Now, as well as the standard control panel, there's a full management console for advanced options like setting up port and IP ranges. Improvements to networking mean that if you have a different security profile for each adaptor, or for your work VPN, they're all active — so the VPN won't stop your Wi-Fi web browsing. Parental Controls still lock down what children can use the PC for,


Column 286
All of the Windows 7 applications have seen incremental upgrades. Love it or loath it, the Ribbon is now everywhere.
Don't expect massive leaps forward for games, but everything else works much better than it used to.

but web filtering now needs extra security software.

Only the Ultimate edition includes BitLocker, which can now encrypt removable drives as well as your hard drive. This is ideal if you carry important documents on a USB stick. Still, it really should have been in the Professional edition as well.

ENTERTAINMENT

Windows Media Player is still one of those love-it-or-hate-it apps, but Windows 7 makes it better by adding Jump Lists that let you choose between recent and favourite playlists, a mini-player with all the features you need on the context menu and an even smaller mini-player in the preview thumbnail. You can send your music to play on another PC in your homegroup as well as on DLNA devices like Sonos ZonePlayer or an Xbox.

All of the above works flawlessly. Remote streaming over the internet is a little more problematic though, making you jump through hoops such as Windows Live ID. Still, after it's done, and depending on the network you're on, you'll be able to watch video and listen to music on the road without any extra software.

The big change in Media Center — support for internet TV alongside broadcast TV — won't show up until the consumer launch in October. What we've got right now is better performance and an improved interface. Highlights include pop-up detail views, and thumbnail previews when you skip or rewind.

You'll need new (as yet unreleased) graphics hardware to take full advantage of Direct3D 11's ability to offload general-purpose tasks to the GPU and speed up everything from playing DVDs to converting videos, but even with Direct3D 10 cards, Microsoft promises better resource management and multithreading if developers build using DirectX 11. Other APIs like Direct2D will also offer better graphics performance if software is written to use them.

MOBILITY

Windows 7 runs happily on netbooks and notebooks alike, and the changes should also improve battery life. There are specific improvements for notebook hardware, including support for the TRIM command to improve SSD performance, virtualised Wi-Fi (for sharing a hotel Wi-Fi connection with wireless devices via your notebook), built-in support for fingerprint sensors, extra Bluetooth profiles (including A2DP) and support for GPS so that several applications can use them at once. But the big new feature for mobile devices is multitouch, a huge step forward from the button presses and 'flick forward or back' system found in Vista. The interface changes subtly, with bigger icons and touch targets on the taskbar. The most basic gesture lets you scroll up and down by moving your fingers over the page rather than trying to grab the scroll bar. Put one finger on the screen and tap with the other to get a right-mouse click, and simply pinch and stretch with two fingers to zoom. This works in any app with scrollwheel zoom, although it's smoothest in apps like IE8 that have been optimised for it.

These gestures are natural and intuitive, like most of Windows 7. Unlike the rest of the OS, they need new hardware and software to make the most of them. Overall, though, just about every other feature in Windows 7 is going to make your life a little bit better on any PC — and that's a big step forward from Vista.

DOES WINDOWS 7 LIVE UP TO THE HYPE?

Windows 7 is proof that a world-class upgrade doesn't necessarily have to change the world. Microsoft might baulk at the idea that its new release isn't the moment you'll mark down for the rest of your life as the day everything changed, but really, this way is for the best.

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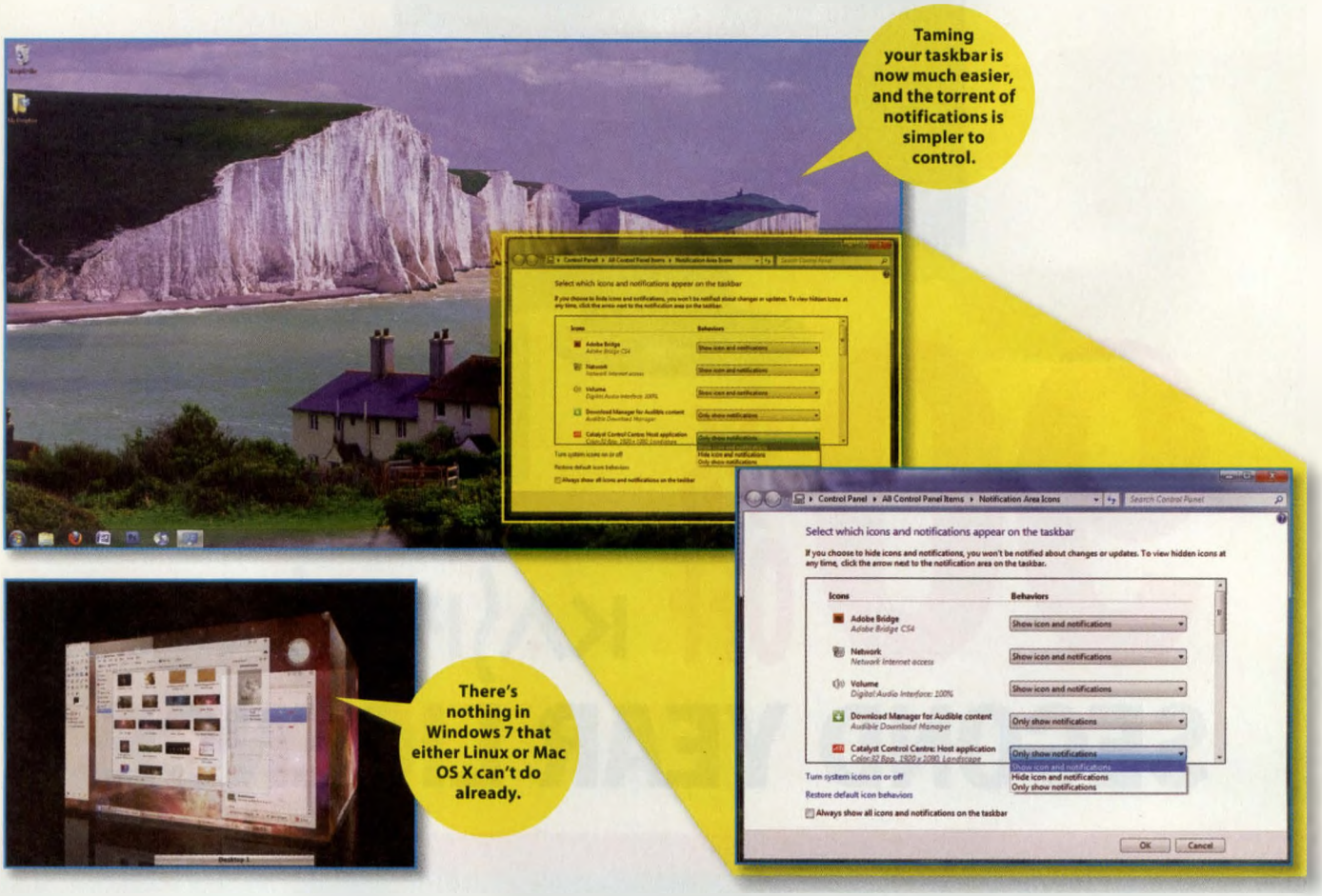
Taming your taskbar is now much easier, and the torrent of notifications is simpler to control.
There's nothing in Windows 7 that either Linux or Mac OS X can't do already.
Control Panel ▸ All Control Panel Items ▸ Notification Area Icons
Select which icons and notifications appear on the taskbar
If you choose to hide icons and notifications, you won't be notified about changes or updates. To view hidden icons at any time, click the arrow next to the notification area on the taskbar.
Icons
Behaviors
Adobe Bridge
Adobe Bridge CS4
Show icon and notifications
Network
Network Internet access
Show icon and notifications
Volume
Digital Audio Interface: 100%
Show icon and notifications
Download Manager for Audible content
Audible Download Manager
Only show notifications
Catalyst Control Centre: Host application
Only show notifications
Show icon and notifications
Hide icon and notifications
Only show notifications
Turn system icons on or off
Restore default icon behaviors
Always show all icons and notifications on the taskbar
OK
Cancel

There's no single individual feature on offer that makes it a must-buy, no one addition that stands out as The Reason. Instead, you get a much more comprehensive collection of smaller tweaks, polishes, new features and general updates that ensure that when you do upgrade your system, you won't ever go back.

Unlike the big Vista jump, it's unlikely that you'll hit much in the way of compatibility issues. We can't speak for every product out there, but we've yet to find anything in the office that hasn't either worked almost immediately (indeed, Windows 7 detected many bits of hardware that Vista didn't, including the twiddlier examples like our test machine's Ethernet and its graphics card), from the latest games to your old applications.

There are still the compatibility modes if you need them, but so far it's been very smooth sailing. Most of us have been using Windows 7 as our primary operating system since the Release Candidate version came out a few months ago — that's definitely not something we would have said about Microsoft's last offerings.

GOODBYE XP

As for Windows XP, consider it firmly at the end of its life. Vista's numerous problems (and, more importantly, the over-exaggerated issues that turned many people away from it) may have granted it a reprieve, but Windows 7 is its death knell. Even if it looks too similar to Vista at times, the new OS is light years ahead of XP.

The one interesting feature it does have — in the Professional and Enterprise/Ultimate edition — is XP Mode, which is a built-in virtual PC for backward compatibility. This is a good start, but it should have been a standard feature with all versions. Instead, if you need that feature, you're better off tracking down a dedicated virtual machine, especially given its compatibility issues with a number of chipsets.

Virtual machines also stand out more generally as something of a missed opportunity. Support for everything from sandboxing to backward compatibility should have been included with the operating system. Instead, the feature feels like something of an afterthought. Still, no matter. There's always next time, when the VM companies might finally have nailed 3D graphics in their virtual computer systems.

DIRECT SELLING

For the moment, the next big technology on its way is DirectX 11 — although again, it'll be a long time before it becomes mandatory. DirectX 10 can do some impressive things, but the push towards it with Vista hasn't led to an industry-wide revolution, so DirectX 9 is still the effective standard. We've also yet to hear of any software being artificially fixed to only run with either Windows 7 or the new DirectX, as happened — embarrassingly — with Vista and Halo 2. It'll still be worth investing in a decent graphics card if you like to play a lot of games, but if your existing one is up to standard with XP or Vista, it'll be fine for a while longer in Windows 7.

Is it time to buy Windows 7? Yes, absolutely. There will unquestionably be some issues over the next couple of months, but after so much public testing, it's unlikely that any will be too problematic. The OS will get you ready for the next year of computing and offer plenty of pleasing tweaks and nice surprises, particularly if you've spent the last couple of years getting progressively wound up over some little annoyance with Vista. Windows 7 is here, it's ready to go, and it deserves to be your new operating system.

Richard Cobbett

www.apcmag.com

A couple of reasons to check out the APC web site

Tech news as it happens

We provide you with the overview of the last month in tech in each issue of APC, but for the latest news updates, check out APC's online news. APC's award-winning journalists are on the case every day, reporting news from the biggest events in tech around the world.

We report breaking tech news as it happens, and we always secure the Australian release dates and pricing as often as possible, so you don't have to go hunting for it yourself.

apcmag.com/news

Got computer problems?

apcmag.com has a vibrant online forum community, centred around helping you get the most from your PC and fix any problems you face along the way. If you've got a problem, go to apcmag.com/forums and post your question in the appropriate topic area.

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WINDOWS 7

Nick Race builds four different PCs all offering different advantages for running Windows 7.

Win 7 budget-buster

Just because Windows 7 is a cutting edge OS doesn't mean you need to spend a fortune on a PC to run it. This build, including keyboard, monitor and mouse can be had for $865 plus the cost of Windows 7.

The integrated graphics on the motherboard are fully compatible with the Windows 7 3D features and keep costs right down. This hardware build will be just fine for internet usage, multimedia playback and office work of all sorts and descriptions.

BUDGET $865

CPU

AMD Athlon Phenom II X3 710

A triple-core Phenom II processor that runs at 2.6GHz. A little boost from the extra core, and the included cooler keeps it ticking along nicely.

AMD > www.amd.com $145

COOLER

AMD stock cooler

Included with the Phenom II X3, the AMD stock cooler even has thermal paste applied for a plug-and-go experience.

AMD > www.amd.com $0

MOBO

Gigabyte GA-MA785G-UD3H

The 785G chipset implements Radeon 4200 graphics: full support for Windows 7 Aero, good multimedia and entry-level gaming.

Gigabyte > www.gigabyte.com.au $120

RAM

Kingston ValueRAM KVR800D2N5K2/4G

With RAM prices this cheap, there's no reason not to go to 4GB even with a budget system. This DDR2-800 CL5S memory suits well.

Corsair > www.corsair.com $120

GRAPHICS

Integrated Radeon 4200

The Radeon 4200 integrated in the motherboard takes care of 3D duties. It's not gamer fuel, but Windows 7 will run just fine

AMD > www.amd.com $0

HDD

Western Digital Caviar Green 500GB

This 500GB drive includes plenty of storage space, decent performance and a very reasonable price tag.

WD > www.westerndigital.com $75

HDD 2

None needed

(At this price level, one drive will do.)

N/A > $0

OPTICAL

LG GH22NS50 SATA DVD-RW

It's fast with 22x writing and the SATA connection means reduced wiring in your case. Budget another $100 if you want Blu-ray.

LG > www.lge.com $75

PSU

Antec EarthWatts 430W

You can buy PSUs much cheaper, but you'll save time and money in the long run by purchasing a reputable brand.

Antec > www.antec.com $85

CASE

Thermaltake Wing

The Wing is an entry-level steel case from Thermaltake. It's got room for two 120mm fans and acceptable cable management.

Thermaltake > www.thermaltake.com.au $60

MONITOR

AOC 919Sw 19in

This new model from AOC lacks a DVI input, but a D-SUB connector on the motherboard means this isn't a problem.

AOC > www.aoc-monitoranz.com $165

KEYBOARD

Logitech Ps II Keyboard and Mouse

An affordable but effective combo. Combining packages of keyboard and mouse is the best way to stick to a budget.

Logitech > www.logitech.com.au $20

MOUSE

Logitech Ps II Keyboard and Mouse

Included with keyboard.

Logitech > www.logitech.com.au $0

WINDOWS 7

Windows 7 Home Premium

At this price range and for the purposes of this system, Windows 7 Home Premium should fit the bill nicely.

Microsoft > www.microsoft.com $299

BUILDS

Win 7 games machine

We kept the price of this beastie below $3,000 including keyboard, mouse and monitor, but there's plenty of room to move with some of the components. Switching from the SSD to a mechanical hard disk drive will save a few hundred dollars (and increase overall capacity) while a less expensive graphics solution or a simpler chassis can make it more affordable. Consider hanging on to the X58 motherboard and Core i7 900 series chip, as they let you go for full throttle SLI or CrossFire in the future.

GAMING PC $2,914

CPU — Intel Core i7 920

Expensive compared to the Core i7 800 series chips, but uses the X58 chipset and lets us use full-speed SLI or CrossFire configurations.

Intel > www.intel.com.au — $370

COOLER — Thermolab BARAM Cooler

The BARAM moves some serious heat, and with the Core i7 920 you want the headroom for overclocking.

Thermolab > www.thermolab.com — $80

MOBO — Gigabyte GA-EX58-UD3R MB

Stable and reliable under both stock and overclocked conditions; also supports both Nvidia SLI and ATI CrossFireX technology.

Gigabyte > www.gigabyte.com.au — $270

RAM — OCZ 3G1600LV6GK 6GB

With 1,600MHz speeds, aggressive timings and 6GB capacity, this kit isn't going to break the bank at $200.

OCZ > www.ocz.com — $200

GRAPHICS — NVIDIA GTX 295

Still the single fastest graphics solution on the market, the GTX 295 can be paired up for even greater 3D speeds.

Nvidia > www.nvidia.com — $620

HDD — G.Skill Falcon 128GB SSD

Though SSDs are still in the less than commonly affordable basket, the speed increase for loading times is worth the extra bucks.

G Skill > www.gskill.com — $420

HDD 2 — Western Digital Caviar Green 500GB

If this is a pure gaming rig, you can even keep this out of the mix. It's good to have more storage for multimedia files, however.

WD > www.westerndigital.com — $75

OPTICAL — ASUS DSW2412S SATA DVDRW

It'll be a long time before we see games on Blu-ray; in the meantime, the fastest DVD drive you can find will cut install and loading times.

ASUS > www.asus.com.au — $75

PSU — Corsair TX750

An excellent-quality power supply with a massive 60A single rail, it's capable of fulfilling any reasonable power requirements.

Corsair > www.corsair.com — $220

CASE — Lian-Li Lancool PC-K60

Though it's not the fanciest system on the block, it supports 3-Way SLI and full-length graphics cards.

Lian Li > www.lian-li.com — $140

MONITOR — BenQ E2200HD

A 21.5in Full HD screen that wont break the bank. With a 1,920 x 1,080 res, you can even break out the occasional HD movie.

Ben Q > www.benq.com.au — $235

KEYBOARD — Logitech G15

At $99 the G15 is a solid purchase for any keen gamer looking for a keyboard with an LCD display and macro keys.

Logitech > www.logitech.com.au — $99

MOUSE — Razer Lachesis

Equipped with a 4,000dpi laser sensor, 9 buttons total and symmetrical design; allows equal touch for both lefties and righties.

Razer > www.razerzone.com — $110

WINDOWS 7 — Windows 7 Home Premium

At this price range and for the purposes of this system, Windows 7 Home Premium should fit the bill nicely.

Microsoft > www.microsoft.com — $299

Win 7 all-rounder

Care to do a bit of everything? This build includes enough processing power to work through multimedia and graphics editing, some mid-weight gaming and pretty much anything else you can think to throw at it. There's a little more to spend on a TV tuner card if you want to watch live TV through Windows Media Center.

ALL-ROUNDER $1,616

CPU — Intel Core i5 750

Though it may be the baby of the mid-range market, the 750 still has heaps of power to get the job done and with overclocking options to boot.

Intel > www.intel.com.au — $275

COOLER — Intel stock cooler

Though it's not very fancy, the new stock coolers for the Core i5 are small and relatively quiet. And you can't beat the price.

Intel > www.intel.com.au — $0

MOBO — MSI P55-CD53

MSI's entry-level P55 ATX motherboard stocks enough features for everyday use. The only thing missing is SLI support.

MSI > www.msicomputer.com.au — $200

RAM — Kingston ValueRAM KVR1333D3N9K2

A quality brand and a good price means this 4GB kit is hard to pass up. 4GB is plenty for a good Windows 7 experience.

Kingston > www.kingston.com — $145

GRAPHICS — Manli Radeon HD4870 OC 1GB

At less than $250, it's hard to pass up this pretty high-end ATI card, with bonus overclock out of the box.

Manli > www.manli.com — $250

HDD — Seagate Barracuda 7200.12 1TB

With one terabyte of storage, there's plenty of room to stretch your legs, while the 7200.12 drive has good performance at a decent price.

Seagate > www.seagate.com — $150

HDD 2 — None needed

(At this price level, one drive will do.)

N/A — $0

OPTICAL — LG GH22NS50 SATA DVD-RW

It's fast, with 22x writing, and the SATA connection means reduced wiring in your case. Budget another $100 if you want Blu-ray.

LG > www.lge.com — $75

PSU — Antec EarthWatts 500W

500 watts is enough for this machine, while the EarthWatts brand from Antec will lower heat output and, theoretically, your power bill.

Antec > www.antec.com — $129

CASE — Cooler Master Elite 334

Perhaps not the world's most stylish case, but it's well built, well ventilated and doesn't cost the earth.

Cooler Master > www.coolermaster.com — $79

MONITOR — Viewsonic VA1918WM 19in

At less than $200 and with an easy-on-the-eyes 1,440 x 900 resolution, this 19in widescreen monitor is perfect for general usage.

ViewSonic > www.viewsonic.com.au — $179

KEYBOARD — Microsoft Digital Media Keyboard 3000

With a swathe of special buttons for Windows functionality, plus a Flip3D key for window swapping.

Microsoft > www.microsoft.com — $69

MOUSE — Microsoft Intellimouse Explorer

A very comfortable laser mouse with years of product experience behind it. Nice to use and at the right price.

Microsoft > www.microsoft.com — $65

WINDOWS 7 — Windows 7 Home Premium

At this price range and for the purposes of this system, Windows 7 Home Premium should fit the bill nicely.

Microsoft > www.microsoft.com — $299

BUILDS

Ultimate Win 7 machine

We always love putting together one of these price-is-no-object PCs, although throwing down nearly 8K for a new system is out of bounds for nearly everyone, considering the best-in-class components. With some carefully considered adjustments (like dropping the $1,000 SSD for a cheaper and almost-as-fast model and the two graphics card SLI solution) the price can drop very quickly, while still maintaining a big performance system. BYO keyboard mouse and monitor and you've cut $1,500 already.

THE ULTIMATE $7,837G

CPU
Intel Core i7 975 Extreme Edition

It wouldn't be the best without the fastest CPU on the block. The Core i7 975 is a 3.33GHz chip fully unlocked.

Intel > www.intel.com.au — $1,370

COOLER
Cooler Master V10

Forget just fans, the V10 uses a combination of fans, a thermoelectric plate, 3 radiators and 10 heatpipes to remove up to 200W of waste heat.

Cooler Master > www.coolermaster.com — $189

MOBO
ASUS Rampage II Extreme

This X58 motherboard has every bell and whistle you could imagine. Good overclocking support, external LCD display and two x16 PCI-E slots.

ASUS > www.asus.com.au — $580

RAM
Corsair CMG6X3M3A2000C7

A top-of-the-line 6GB kit of DDR3 capable of 2,000MHz with some pretty decent timings. If you're looking to overclock at all, this is it.

Corsair > www.corsair.com — $449

GRAPHICS
Inno3D NVIDIA GTX 295 OC x 2

A pair of the fastest cards on the market is going to give enough boost to anything that pushes 3D pixels to stand up and dance.

Inno 3D > www.inno3d.com — $689 x 2

HDD
Intel X-25M 160GB

At 250MB/s this drive just chews through storage tasks. With built-in TRIM support in Win 7 as well, it will keep performing like it's brand-new.

Intel > www.intel.com.au — $1,000

HDD2
Western Digital Green 2TB

If you're going to go big and not that fast, you might as well go green as well. Use this 2TB monster from WD for storing all your data.

WD > www.westerndigital.com — $299

OPTICAL
Sony BWU300S Blu-ray drive

One of the few Blu-ray rewriters on the market, this drive writes Blu-ray single and double layer discs at 8x and DVD at 16x.

Sony > www.sony.com.au — $549

PSU
Cooler Master Realpower 1000W

We're running some very big graphics cards and a very hefty cooler, so this 1,000W monster from Cooler Master should do the trick.

Cooler Master > www.coolermaster.com — $375

CASE
SilverStone Raven 2 RV02

This topsy-turvy case has enough cooling for our hot components and enough room to fit everything in. Looks good too!

Silverstone > www.silverstonetek.com — $249

MONITOR
Dell Ultrasharp 2709W 27in

We could always go for 30in, but you have to sit so far back. This 1,920 x 1,200 monitor has 6m pixel response and a 178-degree viewing angle.

Dell > www.dell.com.au — $1,049

KEYBOARD
Logitech G19

Keyboards are very personal, but we're partial to the G19, it's got good useability and a neat colour LCD for game stats built in.

Logitech > www.logitech.com.au — $300

MOUSE
Cyber Snipa Stinger

Far from the most expensive on the market, this switchable DPI mouse is still the favourite under our mitts in the Labs.

DWW > www.dww.net.au — $89

WINDOWS 7
Windows 7 Ultimate

If you're spending this much and you really want the ultimate rig, you may as well spend a little extra for the Ultimate build of the new OS.

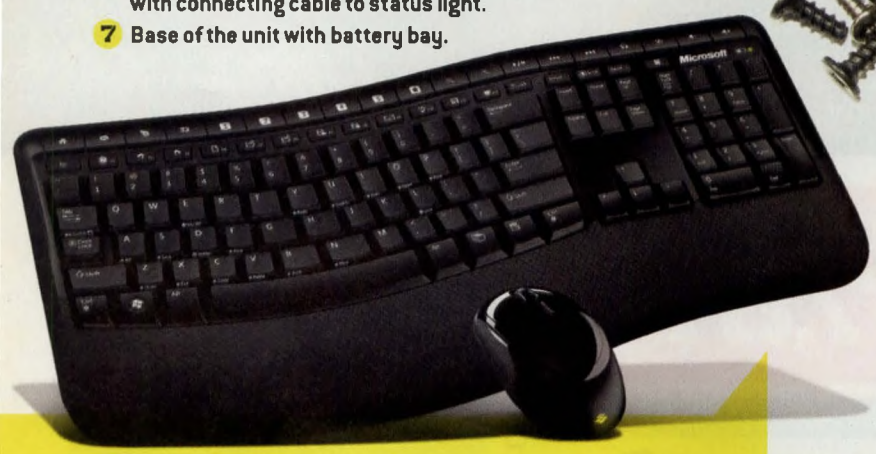
Microsoft > www.microsoft.com — $469

exploding tech

No. 40

In keeping with the Windows 7 theme we're taking a look inside Microsoft's Wireless Comfort Desktop 5000 keyboard, which is optimised for Windows 7.

1. Windows 7 function keys and multimedia keys.
2. Top half of body with QWERTY keyboard.
3. Rubber ergonomic wrist guard for comfort.
4. Silicon touch pad for keyboard.
5. Transparent and flexible main board with keyboard sensors (key switches).
6. Main board with CPU, power supply and battery points with connecting cable to status light.
7. Base of the unit with battery bay.



Screw this: say what you want about Microsoft but it builds its hardware tough. We counted over forty screws in this keyboard.

Dome-switch keyboards are kind of a hybrid of membrane and mechanical keyboards. They bring two circuit board traces together under a rubber dome or bubble. The inside of the top of the bubble is coated in graphite. When a key is pressed, it collapses the dome, which connects the two circuit traces and completes the connection to enter the character.

The main circuit board is known as a flex circuit. This technology is used for assembling electronic circuits by mounting electronic devices on flexible plastic substrates, such as polyimide film.

Microsoft Wireless Comfort Desktop 5000

The ergonomist-approved Wireless Comfort Desktop 5000 utilises a Comfort Curve layout to encourage natural wrist posture. This new desktop set combines the Microsoft Comfort Curve keyboard layout with a soft-touch palm rest to make the PC experience more comfortable.

To complement the comfort, Microsoft has also included smart one-touch features to help consumers make the most of their new Windows 7-based PCs.

TASKBAR FAVOURITES

This new time-saving feature gives users an easy way to access their open programs. Instead of the traditional My Favorites Keys with stored locations, Taskbar Favorites will map to the location of open applications on the improved Windows taskbar.

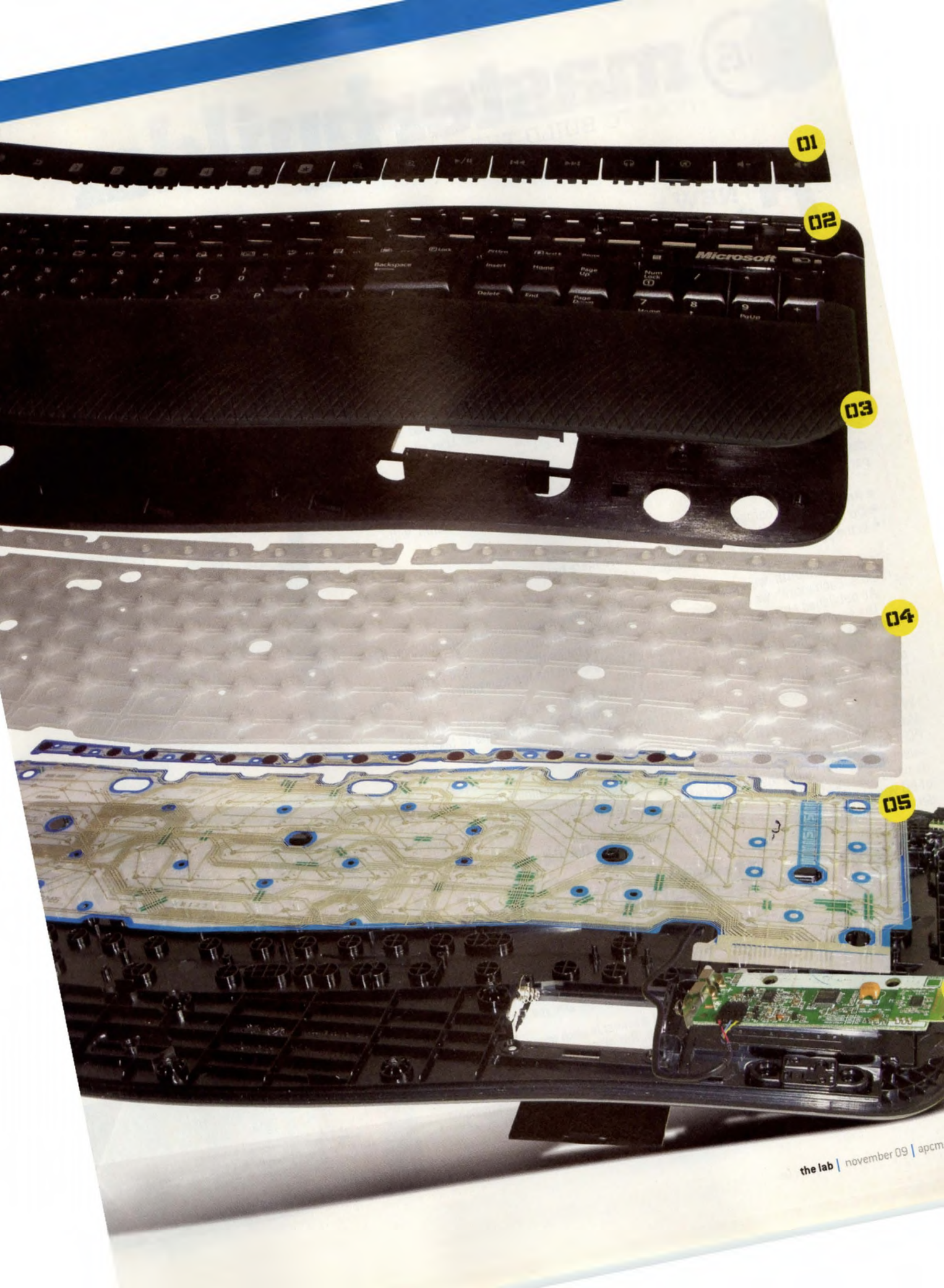
DEVICE STAGE

Microsoft Hardware mouse and keyboard products will support Device Stage, a Windows 7 feature that gives customers quick and easy access to common tasks, including product information, registration, settings and more for popular device categories such as mobile phones, cameras, printers, portable media players and input devices.

WINDOWS FLIP

Microsoft mouse and keyboard users can easily see a thumbnail preview of all open windows with the press of a button. A full-screen preview of the application will automatically display, enabling the user to better identify and select the desired application.

Christopher Zammit


01
02
03
04
05
Microsoft

masterbuilder

HOW TO BUILD THE ULTIMATE PC

NEW

Competition

We want to find APC's first reader-based Master Builder. There is no such thing as the perfect PC, and no totally right or wrong way of building one. It means we can unleash the creativity of our readers in our Master Builder competition, in which you can submit your PC for entry and have it judged by some of Australia's finest professional master builders. The prize for the eventual winner is a stunning high-performance PC.

How the competition works:

Entrants send us the specs of a PC they have built, explaining what the PC is designed to do. We'll assess each entry on how well it delivers on its mission, with particular focus on:

- Are the chosen components the right ones for the job?
- Do the components work well together or are there better combinations?
- Is the spec good value for what it achieves?

Starting this month, we'll pick the best entries and publish them in the magazine over five rounds. Each month we pick a winner, who receives that month's prize.

All published entries will go into the semi-finals to be featured in the April 2010 issue.

The semi-finalists will be given a special challenge, and the top four builders will go into our finals, to be featured in our May 2010 edition.

The finalists will be flown to *APC*'s Sydney Labs to build a PC from a large selection of components. All finalists will also receive a selection of PC components to take home. The winner takes away a full Extreme Performance PC.

What the judges will look for:

Master Builder is not a competition just for overclockers or for building the most powerful PC. Instead, it aims to reward readers who put together a well-balanced PC, with a good selection of components that work together to create a machine whose sum is greater than its parts. The machine can be budget, high-performance, home theatre or any other type of PC you choose. The category is not as important as whether the chosen configuration delivers on its promise.

PRIZES AND ENTRY

Go to apcmag.com/masterbuilder.htm

Submit your PC configuration to *APC*'s Master Builder and, if chosen to appear in the mag, you will win your very own Intel Core i5 quad-core chip and *APC*'s professional Master Builders will also give you some advice on your machine.

PLUS! Our judges will select a winner in each round who takes home a prize from Logitech. This month's winner receives a Logitech Z523 Speaker System worth $199. Unlike standard PC speakers that use forward-firing drivers, the Z523 speakers feature 360-degree sound, or omnidirectional acoustics, which creates a substantially wider sweet spot – an especially helpful feature if you often move your computer around your home or office.

THE JUDGES

THE MASTER BUILDER COMPETITION WILL BE JUDGED BY FOUR PROFESSIONALS:

DAVID KONG – ENSPIRE

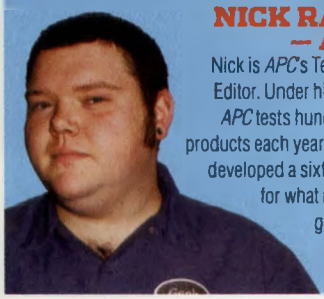
David features regularly in *APC* as a professional master builder. He knows what it takes to build a great PC and is across the capabilities of components from a variety of manufacturers.

MICHAEL LEINS – ALTECH

Michael is Altech's R&D Engineer, whose high performance PCs regularly win Editor's Choices in APC. He is constantly testing and evaluating the latest and next generations of PC hardware.

JEFF LI – PIONEER COMPUTERS

Jeff Li never ceases to surprise *APC*'s staff with his latest creations, which can range from insanely powerful notebooks to small form factor PCs. Jeff knows how to build anything and often does!



NICK RACE – APC

Nick is *APC*'s Technical Editor. Under his watch *APC* tests hundreds of products each year, so he's developed a sixth sense for what makes a good PC.

Bradley Wilson
Gaming and video-editing PC

A PC to play games and edit videos for around $1,600.

SYSTEM COST
$1,602

CORE SYSTEM

Bradley Wilson, 33, is an online gamer who also regularly edits large videos. He's put together a PC that does both tasks and comes in with a core system cost of $1,603. "I am very pleased with the end product," he says.

CPU
AMD Phenom II x4 955 Black Edition — $348

I chose this CPU due to the machine's primary role as a gaming and video-editing PC. Also, being the Black Edition of the CPU, I have overclockability if required.

COOLER
Standard — $0

Keeping it running nice and cool is easy with the standard cooler that comes with the CPU. When I head down the overclocking route I'll consider the CoolerMaster V10.

RAM
Patriot Viper 4GB Kit — $149

(2 x 2,048MB PC12800 1,600MHz PVS34G1600LLK)

With the choice of motherboard, the only option was DDR3 RAM. The Viper set was chosen for its price/performance characteristics.

MOTHERBOARD
Gigabyte MA790FXT-UD5P — $254

This was the hardest part to choose. Hours went into reading comparison tests, with the result being this motherboard. Given that it's already DDR3 and AM3 capable it allows for future upgradeability.

GRAPHICS
XFX HD-489A-ZDEC 1GB 4890 OC Extreme — $269

It was a hard choice between this and the Gigabyte alternative. The XFX won because of the enclosed cooling channel to the fan, instead of just an exposed fan over the GPU.

HARD DISK DRIVE
1TB Seagate SATA Internal — $120

I've never had any problems with Seagate HDDs, so I stuck with what I know.

DVD BURNER
LG GH22NP20 22x SATA Dual Layer DVD Rewriter — $62

This was to back up my Pioneer 216 DVD Rewriter that I had ported from my old machine.

PSU
CoolerMaster UCP 900W — $259

I selected this for upgradability and expandability in the future. It has plenty of power on offer for what I have, with plenty left over for any other items I include later.

CASE
CoolerMaster Storm Scout — $141

Being a LAN and online gamer, the machine had to look great aesthetically. The fact that this case is so quiet as well just enhanced my decision to buy it.

EXTRAS

MONITOR
Samsung 22in 2243BW — $243

After using the 24in Samsung monitors at work, this was a no-brainer. Excellent crisp colours.

AUDIO
On-board HD/Logitech x-530 — $90

With HD sound onboard the Gigabyte motherboard, I didn't feel the need to add a sound card. The 5.1 Logitech speakers are great.

KEYBOARD AND MOUSE
Microsoft Sidewinder x6 Keyboard — $69

Microsoft Sidewinder x5 Mouse — $49

When gaming, you must have a gaming keyboard and mouse at the touch of your fingertips. Major winning attributes of the Sidewinders were the price difference from the other gaming peripherals.

Total cost with extras: $2,053

JUDGE'S VERDICT: BRADLEY'S GAMING AND VIDEO PC

The judges thought Bradley's machine wasn't bad for a video-editing and gaming system. Michael Leins thought a quad-core CPU was always a good choice for video editing, while the Phenom x4 955's high clock speed would not let Bradley down in gaming either. However, the judges agreed that the power supply chosen for his unit was complete overkill, even taking into account all the upgrade options offered by the case. Jeff Li said "For my dollar I would have used the Corsair HX620 PSU (-$100) and added a TRUE BLACK 120 heat sink (+$89)." David Kong thought another weakness was the storage system. "Video editing is disk intensive, and works best when video data and scratch disks are separated from the operating system and application drive. By adding in a second hard drive, he can keep things running smoother when editing large videos."

Matt Callaghan
Budget gaming PC

A gaming PC with a very low core cost of $743

SYSTEM COST $743

Matt Callaghan, 17, built this PC working to a $1,000 budget (including monitor). He says this machine runs Crysis at full resolution (1,920 x 1,080) with all settings on high at a very playable frame rate. He has overclocked both the CPU and graphics to get what he says is "extreme performance for very little money." The total setup cost is actually $1,327 with the addition of Windows 7 Home Premium, but, he says, "This is still a great price for a gaming computer which is capable of Crysis."

CPU
Intel Pentium Dual Core E5200 — $93
Intel says the E5200 is a Pentium Dual Core but it shares the same architecture as the Core 2 Duo. I overclocked the E5200 from 2.5GHz up to 3.8GHz, a massive 52% overclock which gives me a performance similar to that of an E8400, which costs $235.

CPU COOLER
Cooler Master Hyper-212 — $59
This thing is absolutely *massive*. It barely fits into my case and covers a quarter of the motherboard, but is needed as it keeps the CPU cool under extreme overclocking.

MOTHERBOARD
ASUS P5Q PRO — $156
I love ASUS motherboards as I have built computers for friends and have found them really robust. The BIOS of this one makes overclocking dead easy. It has a P43 chipset so it has one PCI-e x16 slot for graphics.

MEMORY
Kingston DDR800 4GB kit — $62
I was on a budget and this RAM is very cheap. I thought I would be better off getting 4GB of reasonably fast RAM than 2GB of superfast.

GRAPHICS
Sapphire Radeon HD4850 — $169
The Sapphire Radeon HD4850 is the cheapest of the 4850s and had a double-slot cooler, which allows for some overclocking.

HARD DISK DRIVE
Western Digital 320GB — $69
I wanted a decent-sized hard drive to store music and movies but with room for a second operating system. This drive suited my needs as it's dirt cheap and of reasonable size. I have two partitions, one for my main OS and the other for a Linux-based media front end.

OPTICAL
LG DVD writer — $55
I wanted a quiet DVD drive. Unfortunately, this is quite loud when spinning up but it serves its purpose.

CASE
Case Com 3370 — $80
This case looks great and includes a 500W PSU, which makes it insanely good value. I wanted something that will last a while and look good at the same time. The case has an eSATA and two USB ports on the front, which makes it perfect for my use.

EXTRAS

MONITOR
Samsung 2233sw 21.5in — $239
Looks beautiful and performs astoundingly, plus the resolution is great (1,920 x 1,080) for the price.

KEYBOARD
Logitech keyboard — $17
The generic Logitech keyboard I bought long ago works fine for my needs.

MOUSE
Gigabyte Dual Lens Laser Gaming Mouse — $29
Comfortable, great accuracy and cheap.

OPERATING SYSTEMS
Windows 7 Home Premium — $299
This OS is great, it is 64-bit so can address all of the RAM and it looks good.

Mythbuntu Linux — $0
I use this as a media front end.

Total setup cost - $1,327

JUDGE'S VERDICT: MATT'S GAMING PC

To the judges, there are two ways of looking at Matt's system. Michael Leins pointed out that, given the price tag, the system was a good budget gaming system that could be put together quickly, while the overclocking of the CPU to 3.8GHz was impressive. One downside was that the HDD would be a bit small for running dual-boot and lots of applications. Li took another perspective. To him, this system was a classic example of building to a price, not to a product. Li said: "Although overclocking with select components can help optimise the performance of a system, exceeding the limitations not only degrades the performance of the system but shortens the life of the components." Li thought that if price was the only object, then a significantly better AMD system could be built to suit this budget.

Damien Pedler
Mid-range gaming PC

APC MAGAZINE ROUND 1 MASTER BUILDER COMPETITION WINNER NOVEMBER 2009

Manage your movies and music with this home-theatre PC for $1,048.

SYSTEM COST $1,048

Damien (Damo) Pedler is 15, but as he points out, "I have spent a lot of my life interested in computers." He wanted to build a home-theatre PC so he spent some time researching it, and reckons it's the fastest gaming PC we've featured in Master Builder yet.

CPU
AMD X3 Phenom II 720 Black — $188
I picked this processor due to its great value. It has the advantage of an extra core over the other processors in its price range, it will outperform or equal an E8500 and it will thrash the E8500 in multithreaded games.

MOTHERBOARD
Gigabyte MA770T-UD3P — $126
This motherboard is a no brainer at the moment, it has a great feature set if you are looking into a single-card setup and it is one of the cheapest AM3 motherboards, which takes DDR3 RAM.

RAM
4GB Kit (2x2GB) DDR3 1,333MHz G.Skill Pi — $92
This isn't the cheapest 4GB DDR3 kit you can get, but it is a great balance of performance and value. It is less than $15 more than the cheapest 1,333 kits and you get better RAM.

GRAPHICS
Gigabyte GTX275 896MB — $299
This card will handle pretty much anything and at under $300, it's a steal! It is on par with the 4890, and depending on which review you read, either one of them is better. The only reason I picked this card over the 4890 is because for a Gigabyte it is $10 cheaper. Gigabyte is great for graphics cards due to its great warranty.

HDD
WD 640GB 16MB Sata II — $95
This a great drive for the price; go for the black or the blue if speed is your goal.

CASE
Antec 300 — $98
This is a very good case for under $100, which leaves you a good amount of money to spend on the power supply, without needing to skimp on the case.

POWER SUPPLY
Vantec ION2+ 600W — $95
Vantec are a good company making a name for themselves with budget and enthusiast builders alike. They offer good-quality power supplies at great prices. 600W is major overkill for this box, but the ION2+ is better than the rest of the Vantec range, so it is worth the extra.

OPTICAL DRIVE
Pioneer 218BK — $55
This disk drive seems expensive due to the price, but it is really about the same price as the rest due to the current disk drive shortage. Pioneer have long had a name for good-quality burners, and this drive is no different.

EXTRAS

MONITOR
Samsung 2494HS — $340
The Samsung is a 23.6in 1080p TN panel. It is great value for money and has decent picture quality.

KEYBOARD AND MOUSE
Microsoft Wireless Laser Desktop 7000 — $109
To me, on a great computer, the keyboard and mouse are not the place to skimp. I use this package myself, and it has a great feel to it.

OPERATING SYSTEM
OEM Microsoft Windows Vista Home Premium 64-bit SP1 — $152
Vista has been great since SP1, though with Windows 7 fast approaching, I would either make sure you can upgrade or use Windows 7 RC1 until the retail comes out.

Total including extras: $1,648

JUDGE'S VERDICT: DAMIEN'S MID-RANGE GAMING

The judges picked Damien as this month's winner. "This is an outstanding base for a fast and furious gaming system," said Nick Race. "The CPU and motherboard combination have plenty of power for modern games and keep costs nice and low. The graphics card runs very warm, so Damo should make sure there are plenty of fans in the case." Michael Leins agreed this was a very well-rounded PC for media, gaming and general use. Li thought Damo's use of a larger case had cleverly avoided the problem of the heat generated by the high-end components: "I think this build demonstrates how beneficial doing your research before committing to a purchase can be," said Li. The only thing Race would have changed was the wireless mouse. "Wireless models all too often leave me with a dead battery in the middle of a frantic fragging session."

One of the joys of computing is building your own PC. Each month a professional Master Builder will configure a PC for a specific task and pricepoint, recommending the best components for the job.

Build a notebook

Can you build your own notebook? Notebook master builders **Joshua Miller** and **Cosmin Vonu** reckon you can.

Although notebooks now outsell PCs, virtually all notebooks are sold as complete systems. We asked Aussie notebook maker Pioneer Computers Australia to build a DIY notebook with components that are available off the shelf. Pioneer's master builders, Joshua Miller and Cosmin Vonu, have built us a powerful notebook for gaming — which is not surprising since their company makes it a practice of shoehorning the latest technologies into notebooks and sending them to us for review.

One example was the first notebook running a Core i7 chip (the over-the-top Dreambook D90 i7 reviewed last month). But as you can see in the spec below there are significant differences between building a PC and notebook. While you can build a PC from the smallest individual parts, a notebook comes in bigger chunks with its final configuration heavily dependent on the barebone system that underpins it and the kind of battery life you expect.

CORE SYSTEM

SYSTEM COST
$4,649

BARE BONE SYSTEM

DreamBook Power M98 Bare Bone — $2899

The basic building block of a DIY notebook is what's called a barebone system. Unlike a PC, where the motherboard, case, cooling and screen are available separately, in a DIY notebook you buy a chassis which already has a motherboard and screen built-in (like a PC case with fans already included). This is because the components need to come together into a very snug fit that is impossible to achieve if designed independently. In our case, we have chosen a powerful barebone system with a massive 18.4in 1,920 x 1,080 Full HD display for serious gaming, but barebone notebooks of all kinds are available from different vendors.

CPU

Intel Core 2 Duo T6500 2.10GHz — $119
[64-bit 2MB cache 800MHz 45nm]

Barebone systems can accommodate various CPUs. The one chosen for this notebook build can support Quad Core or even Extreme Quad Core mobile processors, but Intel's T6500 CPU for notebooks still produces all the grunt required for most gaming and we think it's the best value mobile CPU available.

RAM

4GB (2 x 2GB) 1,066MHz DDR3 RAM — $199

Our barebone system can support up to 8GB of RAM at speeds of up to 1,333MHz, ideal for 64-bit OSs and games that support more than 4GBs of memory. But the T6500 CPU we have chosen for our build can perform well with 4GB of 1,066MHz RAM.

GRAPHICS

Nvidia GeForce Go GTX 280M 1GB DDR3 — $934
[PCI Express Graphics SLI]

We wanted to show just how far you can go with graphics in a notebook so we've given this system the most powerful mobile card on the market, the Nvidia GeForce Go GTX in SLI configuration! This combination produces unrivaled gaming graphics performance on a notebook.

AUDIO

On board High Definition Audio - $0

The barebones system has an in-built high definition audio card based on the Realtek sound chip. It comes with all the expected features such as headphone, microphone, Line In and SPDIF,

The professional master builders from Pioneer Computers who built the DIY notebook. From left, Cosmin Vonu and Josh Miller next to their DIY creation.

but also has 5.1 surround sound speakers to give a full range audio experience for portable gaming and music playback.

HARD DRIVE

3 x 320GB 5,400RPM Serial-ATA 2.5in hard drives — $449

Our notebook can handle up to three 2.5in SATA2 5400 or 7200-rpm hard disks (or SSDs up to 1TBs each) so we've taken the opportunity to cram them all in, using a RAID 0 configuration.

OPTICAL DRIVE

8x DVD-/+RW dual-layer drive — $49

The notebook can take Blu-ray or even old HD DVD drives, but since this machine was built for gaming, we have fitted a DVD drive.

AC ADAPTOR, BATTERY, POWER CABLE

Included with the barebones system.

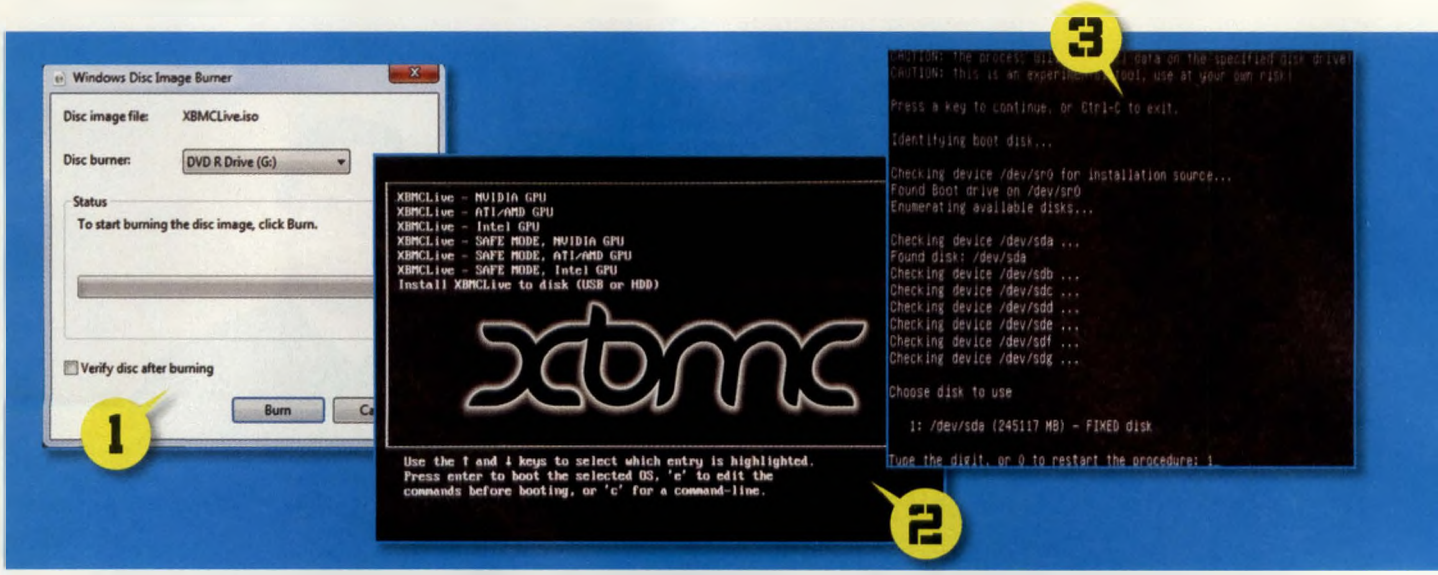
TIPS

01 You can't build a notebook completely from scratch. You have to start with a sizable barebones system that already includes core components such as case, motherboard and screen. The components you can vary tend to be the CPU, RAM, graphics and storage.

02 It follows that you should select your barebones system wisely. In a PC you can start with something affordable and swap components in and out to end up with something powerful, but with a DIY notebook system you need make doubly sure it can accommodate the kind of components you plan to add down the track.

03 Think carefully about the kind of battery life you want, since that has a massive influence on the final design. In fact, a notebook could be described as being almost entirely a balancing act in making a battery last longer, with every single component playing a role. If you want to build a gaming notebook (like the one we've just built) then battery life is not an issue, since it will be plugged into the mains most of the time. But if you want something portable, then start with a small screen as possible and shrink everything else as much as you can tolerate.

04 *APC* would love to hear from anyone who has built a notebook and actually achieved a better result than an off-the-shelf machine. You can even enter it into our Master Builder Competition at: **www.apcmag.com/masterbuilder.htm.**


Windows Disc Image Burner
Disc image file: XBMCLive.iso
Disc burner: DVD R Drive (G:)
Status
To start burning the disc image, click Burn.
Verify disc after burning
Burn
1
XBMCLive - NVIDIA GPU
XBMCLive - ATI/AMD GPU
XBMCLive - Intel GPU
XBMCLive - SAFE MODE, NVIDIA GPU
XBMCLive - SAFE MODE, ATI/AMD GPU
XBMCLive - SAFE MODE, Intel GPU
Install XBMCLive to disk (USB or HDD)
xbmc
Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, 'e' to edit the
commands before booting, or 'c' for a command-line.
2
Press a key to continue, or Ctrl-C to exit.
Identifying boot disk...
Checking device /dev/sr0 for installation source...
Found Boot drive on /dev/sr0
Enumerating available disks...
Checking device /dev/sda ...
Found disk: /dev/sda
Checking device /dev/sdb ...
Checking device /dev/sdc ...
Checking device /dev/sdd ...
Checking device /dev/sde ...
Checking device /dev/sdf ...
Checking device /dev/sdg ...
Choose disk to use
1: /dev/sda (245117 MB) - FIXED disk
3

YOU'LL NEED THIS

XBMC
This free multi-platform system has everything you need for a full media centre experience. Download it from *www.xbmc.org/download*.

A HIGH-END CPU
XBMC is pretty undemanding, but video playback is not. You will need an Intel Pentium 4, Pentium M or AMD Athlon XP CPU for decoding H.264 at 1080p resolution.

A DECENT GRAPHICS CARD
Any graphics card over a Radeon 7 series, GeForce 6 series or Intel G45 will do, as long as it supports OpenGL 1.4 or higher.

TURN AN OLD PC INTO A MEDIA CENTRE

You don't need to run Windows to play media on your TV; use an old PC and XBMC. **Simon Pickstock** shows you how.

For years, Microsoft has been trying to convince us that we need to have not just a PC in the living room to serve up our media, but a full-blown installation of Windows too. Both Intel and AMD have joined the fray, Intel with Viiv (the brand that no one knew how to pronounce), and AMD with its Live! initiative. Despite all the marketing dollars spent on these ideas, they've been almost universally unpopular for a few simple reasons. First of all, most people don't want a modern high-powered PC, with all the noise they usually make, in the living room. Much as we would like to, we won't be sidestepping this aspect; unfortunately, you'll still need a fairly decent PC. Second, having a PC next to your TV or stereo means that you can't really use it as a standard PC. Trying to run standard applications on a TV screen will make you myopic in an instant, while watching movies on anything under a 24in widescreen monitor in your living room is a very unsatisfying experience. Last but not least, the incredibly long boot times of your average Windows install make a mockery of any sort of instant-on concept.

XBMC — which was originally an app for the first-generation Xbox known as the Xbox Media Center — has become one of those annoying recursive acronyms so common in the world of software: it's now the XBMC Media Center. Despite the name, it's a very capable cross-platform, open-source application that will meet all of your media centre needs. Although it comes in versions for Linux, Windows, and OS X, we're going to look at the Live version. It can be run from CD or installed onto your hard drive, and it is built around its own self-contained operating system.

GET THE SOFTWARE

1 First, head over to **www.xbmc.org/download** and

ADDING EXTRA FUNCTIONALITY

Unlike many media centre applications, XBMC does not include any personal video recorder (PVR) support.

That's not to say that XBMC isn't flexible. With the use of plug-ins, you can add extra functionality such as YouTube access, ShoutCast streaming and television guides. You can even run a version of XBMC on an Xbox (the original, not the 360). However, as it is not a product endorsed by Microsoft, it only works on consoles that have been modded with a physical chip, software or a BIOS update.

One of the most interesting features takes advantage of your internet connection to connect to sites like **www.imdb.com** in order to retrieve plot summaries and episode guides for movies and TV content.

If you know the Python programming language then you can write your own widgets, as XBMC uses the Python scripting engine. There are plenty of ready-made scripts available, including tools to control PVR software such as MythTV.

Other scripts cover such diverse areas as train timetables, cinema guides, movie trailers, emailing, BitTorrent, downloading instant messaging, and even a range of mini-games. Have a look at **www.xbmczone.com** for a full selection of goodies to add to your installation.

download the Live CD image.

It will arrive as a ZIP file, so you'll need to extract it once it's been downloaded. Inside the ZIP file you'll find the ISO image, a Readme file and two other files. The file named 'installXBMC FromISO.sh' is a script file that can be used to install XBMC in a Linux environment, so unless you intend to do that, ignore it. Use your standard disc-burning software to make a bootable image from the 'XBMCLive.iso' file and, once you're finished, plonk the disc in the drive of your old computer.

RUN THE LIVE CD

2 Before you do anything else, you'll need to change the BIOS settings of the PC that you are going to use as the media centre so that it boots from CD. To do this, press the appropriate key — such as Del or F1 — when the computer starts to enter the BIOS settings, and then go to the Boot section. After you've made the appropriate changes, make sure you save them before exiting. When you restart, the PC should run the Live CD and show a Boot menu with various options, including choosing the GPU, running in Safe mode and an option to install to your hard drive. For now, either select your GPU or allow the system to boot to the Live CD automatically. While running the Live CD enables you to get a feel for the application, any settings you change will be lost the next time you reboot, so you're best off installing to your hard drive once you're sure you like what you see.

INSTALL XBMC

3 To install, reboot your machine and choose the last menu option, 'Install XBMCLive to disk (USB or HDD)'. Some older PCs don't support booting from USB devices, in which case you'll have to go with an internal drive. Be careful here: installation will completely wipe all information from your hard drive, so make sure it doesn't contain anything important before you proceed. Fixed disks must be larger than 5GB, while USB sticks need to have at least 1.5GB of usable capacity. You'll need to designate the drive you are installing to. If it's a single fixed drive, this will be Drive 1. You'll also need to confirm that you want to install to a fixed disk rather than removable drive as well as entering a password. The install process takes about 10 minutes. After it's finished, remove the Live CD and reboot.

ACCESS YOUR MEDIA

4 Rather than a media centre — where your content is stored locally — XBMC is more of a 'media extender', in that it is designed to fetch media across a network from shared folders, NAS drives and other UPnP devices. You can use local folders, but this works best if you installed XBMC in Linux or Windows. If you didn't do this, you'll either need to set up a network share on another computer on the network or use a removable hard drive or DVD drive. To set a folder's source, click on the media category — say, for instance, 'Video'. Right-click on the 'Videos' link on the next screen and choose 'Edit Source'. Click 'Browse' and have a look for the shared folder. If necessary, enter a username and password for protected shares. Once this is done you can either add a new shared location using the 'Add' source button, or move on to the next category. When playing video, moving the mouse to the bottom-left corner of the screen will bring up a Playback menu. Press the Esc key to go back up the menu levels.

ADD SOME EXTRA FEATURES

5 As well as playing back your media collection, XBMC can retrieve weather information, run scripts and be customised with different themes and skins. If you fancy being able to access forecasts, click 'Weather > Settings > Region' and change the region to 'Australia' and the time zone to your city. You will now be able to enter your location in the Weather section and receive local weather forecasts. Now go back to the main menu screen and click on 'Settings'. Here you can tweak the defaults for video, music and pictures, as well as editing things like your network settings and autoplay. Clicking the power icon will bring up a new menu from which you can eject discs from the optical drive, shut down, reboot or enter Suspend mode. The only thing left to do is sit back, relax and enjoy the show. APC

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SPECIAL!

WINDOWS 7 THE PERFECT SETUP

Everything starts from the operating system, so it pays to get the version of Windows 7 that's best for you. **James Bannan** shows you how to install it right.

Launching this month, Windows 7 is the operating system that should be installed on any computer currently running Windows XP or Vista. Leaner, snappier, with better usability and navigation, it has the power to transform your PC.

But when it comes to installing Windows 7, you have many options and picking the right one is not as straightforward as it seems. The OS's own install processes don't install it into a vacuum. Just as important is preparing the environment into which the OS will live, and it's here that some work now will pay dividends later.

Even during the simplest install process — a clean install — Windows 7 will ask you on what disk and partition you want to install it. If you just hit Next, then the OS takes over the entire disk to suit itself, but that is not necessarily the best strategy for your data. So we'll show you how to install Windows 7 into a better, multiple-partitioned environment.

Equally, if you have reservations about switching completely to a new OS, you can dual-boot Windows 7, choosing from two OSs installed to the bare metal. Or you might want to just test it as a virtual machine, without fully committing your PC to it. Just as Microsoft has got Windows 7 right for release, our guide will help you get it right on your machine.

WINDOWS 7 THE SIX EDITIONS

Which version of Windows 7 is right for you?

There are six official versions (stock-keeping units, or SKUs) of Windows 7. Only three will be available as retail purchases when the final build is released to the public on October 22. The other three versions are for OEMS and foreign markets.

1 WINDOWS 7 STARTER

A very stripped-back version of the OS, only available pre-installed on machines purchased from system manufacturers (OEM licensing). Starter Edition is very limited, and although you can upgrade to a different version, it is 32-bit only and you can't perform cross-platform upgrades (ie. 32-bit to 64-bit). Expect to see this on netbooks.

2 WINDOWS 7 HOME BASIC

An affordable version of the OS targeted at "emerging" markets like Brazil and India, so it won't be made available in Australia — has several features turned off, from DVD playback to multi-touch support.

3 WINDOWS 7 HOME PREMIUM

The standard operating system for the majority of home consumers. It has all the required functionality including Media Center software, touchscreen controls, all the UI enhancements and bundled applications, and supports up to 16GB RAM (64-bit only).

It doesn't have enterprise features like the ability to join a domain, offline files or BitLocker. It also cannot run Windows XP Mode virtualisation (no bundled licence) and does not support booting from VHD (Virtual Hard Disk images).

4 WINDOWS 7 PROFESSIONAL

This version is targeted at power users and the SOHO market. It has all the functionality of Home Premium but supports up to 192GB RAM (64-bit only) as well as network backups, encrypting file system (EFS) and a licence to run XP Mode.

5 WINDOWS 7 ENTERPRISE

Enterprise is designed for business deployments, is only available to Volume Licence customers with Software Assurance and can be activated using a centralised activation server. However, in a change from Windows Vista, Windows 7 Enterprise is essentially the same product as Windows 7 Ultimate, sporting exactly the same feature set.

6 WINDOWS 7 ULTIMATE

Targeted at home users and is available as a retail purchase, using the standard single-licence activation model. This top-end SKU of Windows 7 supports all the features of all the other builds, including BitLocker and BitLocker To Go, AppLocker and VHD booting. Unlike Vista Ultimate, Windows 7 Ultimate doesn't come with any "premium" features (thankfully).

WINDOWS 7 FEATURES

THE MAJOR FEATURES THAT COME WITH EACH VERSION OF WINDOWS 7

Windows 7 Features	Windows 7 Home Premium	Windows 7 Professional	Windows 7 Ultimate
Support for home networks and networked printers	✓	✓	✓
Watch, pause, rewind, and record TV on your PC	✓	✓	✓
Integrated System Backup and Restore tools	✓	✓	✓
Support for backing up to home or business networks	×	✓	✓
Access to secure company networks via Domain Join	×	✓	✓

UPGRADE

Inside, they're all the same regardless of what version of Windows 7 you install. All the necessary components are installed to run Ultimate, regardless of what you actually purchased. This means that users can upgrade Windows 7 using Microsoft Windows Anytime Upgrade (WUA) – see story on page 67.

WINDOWS 7

PRICING AND UPGRADE GUIDE

What Windows 7 costs and what you can and can't upgrade from.

You can buy Windows 7 outright, known as the FPP or fully packaged product, or as an upgrade from a previous version of Windows.

Home Premium is the most practical retail purchase at $299 FPP and $199 upgrade, with Professional jumping up to $449/$399 and Enterprise/Ultimate $469/$429.

OEM licensing is obviously the most cost-effective approach, and Home Premium, Professional and Ultimate are all available as OEM purchases as well as retail boxes. Of course, this is only useful if you're in the market for a new computer. If you purchased a new Windows Home Premium, Business or Ultimate PC from 26 June this year you'll be able to upgrade to Windows 7 for little or no cost. However, your PC must be eligible, so to find out, go here: **tinyurl.com/ngz4zv**.

IT Pros with multiple computers should seriously consider a 12-month TechNet Plus Direct subscription, which gives you access to multiple, time-unlimited activations of Windows 7 (and every other version of Windows client, server, Office etc) for just over $500.

CLEAN-INSTALL UPGRADING

If you want to do a clean install of Windows 7, in which the OS installs from scratch, then you can upgrade from XP or Vista to any version of Windows 7. Various surveys have shown that the majority of users will do a clean install, if only to make a philosophical break from their XP and Vista past.

IN-PLACE UPGRADING

An in-place upgrade — in which Windows 7 installs itself over the top of an existing operating system and assimilates existing user data — might be convenient for those who don't want to go through the hassle of reinstalling all applications and user data. But it comes with caveats. You can't do an in-place upgrade from Windows XP, which requires a clean install (although something called side-by-side migration, on page 72, might lessen the pain). In-place upgrades work only when you are moving from Vista, but even then, there are restrictions. Your version of Vista will determine what version of Windows 7 you can do an in-place upgrade to (see table below right).

UPGRADING FROM WINDOWS 7

When you receive a new machine with a particular version of Windows 7 installed, in actual fact all the necessary components are installed to run Ultimate, regardless of what you actually purchased.

This means that users can upgrade Windows 7 using Microsoft Windows Anytime Upgrade (WUA).

This is an online purchase which lets you unlock the feature set of a more advanced SKU. Starter Edition can be upgraded to Home Premium, and Home Premium can be upgraded to Professional or Ultimate. There is no upgrade path from Professional to Ultimate, and Enterprise is not available via this process. This means that for the most part, users have the flexibility to upgrade without having to reinstall the operating system, although upgrades from 32-bit to 64-bit are not possible — this will require a wipe-and-load clean install.

IN PLACE UPGRADES

Current Windows	Upgrade to
Vista Home Basic	Windows 7 Home Premium or Ultimate
Vista Home Premium	Windows 7 Home Premium or Ultimate
Vista Business	Windows 7 Professional, Ultimate or Enterprise
Vista Ultimate	Windows 7 Ultimate
Vista Enterprise	Windows 7 Enterprise

WINDOWS 7

FIRST DECISION: 32-BIT OR 64-BIT?

It's the very first choice you have to make when installing your new OS. These are the pros and cons of moving to 64-bit Windows 7.

Every Windows 7 retail box comes with separate 32-bit (x86) and 64-bit (x64) versions of the OS so deciding to stay with 32-bit or move to 64-bit will be the first decision you have to make. But ask users the difference between the two and most will struggle to mention anything beyond a 64-bit CPU's ability to address more than 4GBs of RAM. So we've compiled this list of 64-bit pros and cons to help you make a more informed decision about which version of is right for you.

PROS OF 64-BIT

ADDRESS MORE MEMORY

The most common reason for installing 64-bit Windows 7 is that it can address more than 4GBs of memory (assuming you have a CPU older than an Intel Pentium 4F or Athlon 64, which were released about five years ago). If your machine has more than 4GBs of RAM, 64-bit is a no-brainer, particularly if you're running memory-hog applications like Photoshop, video editors, or virtual machines in a virtualised environment. Technically a 64-bit OS and CPU can address up to 16 billion gigabytes of memory but you get a bit less in Windows 7. Windows 7 Home Premium 64-bit can address 16GBs of memory while Professional and Enterprise/Ultimate up to 192GBs. Still, this compares to roughly 3.4GBs of memory addressable by 32-bit Windows 7.

LOW MEMORY PRICES

You can pick up 4GB of RAM for about $80 or less, so the cost of RAM is simply no excuse if your applications can benefit from extra RAM.

BACKWARD COMPATIBILITY

Most 32-bit Windows applications will work with 64-bit Windows 7, so you get the best of 32-bit and 64-bit software. Be aware, though, that 32-bit drivers won't work with 64-bit Windows 7 and we say "most" 32-bit apps will work (see cons).

64-BIT APPLICATION PERFORMANCE

Since they can use more memory and manage it better, 64-bit programs will in most cases outperform the same 32-bit programs on a 64-bit system. These include Photoshop CS4, Firefox and games like Crysis.

HARDWARE-BACKED DEP

64-bit is more secure, thanks to hardware-based Data Execution Prevention (DEP). This monitors system memory to prevent the execution of malicious code from parts of the memory where it should not be — such as exploits that use buffer overflows.

KERNEL PATCH PROTECTION

This prevents malicious programs from changing the Windows 7 kernel. According to Microsoft, this feature works by helping to prevent a kernel-mode driver from extending or replacing other kernel services. It also helps prevent third-party programs from updating (patching) any part of the kernel.

MANDATORY DRIVER SIGNING

To work with 64-bit Windows 7, all drivers must be digitally signed by the developer. This guarantees that Windows-based software has come from a legitimate publisher and is less likely to cause the OS to crash.

CONS OF 64-BIT

32-BIT DEVICE DRIVERS DON'T WORK

Although 32-bit applications will work in Windows 7 64-bit, 32-bit device drives won't. Most peripherals built in the last couple of years come with 64-bit drivers, but if you're using a five-year old printer or scanner which has only a 32-bit driver you're in trouble.

UNSIGNED KERNEL-MODE DRIVERS DONT WORK

Technically this is actually a good thing, because unsigned kernel mode drivers are a major cause of crashes, but many drivers for older hardware that work fine are unsigned and 64-bit Windows 7 won't let them run.

32-BIT APPS MAY NOT WORK

Technically, 32-bit apps should work in 64-bit systems, but applications are complex things and if you've had trouble running some older XP applications in 32-bit Windows Vista, there's even less chance they're going to work in 64-bit Windows 7.

64-BIT APPLICATIONS MAY NOT WORK IN FULL

An application like 64-bit Photoshop CS4 is a perfect for a 64-bit system, but a variety of Photoshop plug-ins which are not 64-bit may not work.

NOT MANY 64-BIT APPS

Let's see, there's Adobe Creative Suite CS4 (for Windows), Internet Explorer 8, Mozilla Firefox, Windows Mail, Counterstrike and Crysis and, ahem, more are coming. Even Microsoft's own Office 2007 is not 64-bit, although Office 2010 will come in both flavours.

SO WHICH ONE?

64-bit means being prepared to make a break with the past. If you have a new computer, more than 4GBs of RAM, use newish 32-bit software and don't support peripherals older than a couple of years, 64-bit will take you to the next level of computing. If your PC has 4GB or less of RAM, uses a range of software from new to legacy, and supports some older peripherals, stick to 32-bit Windows 7 and save yourself the hassle of various incompatibilities and unexplained application crashes.

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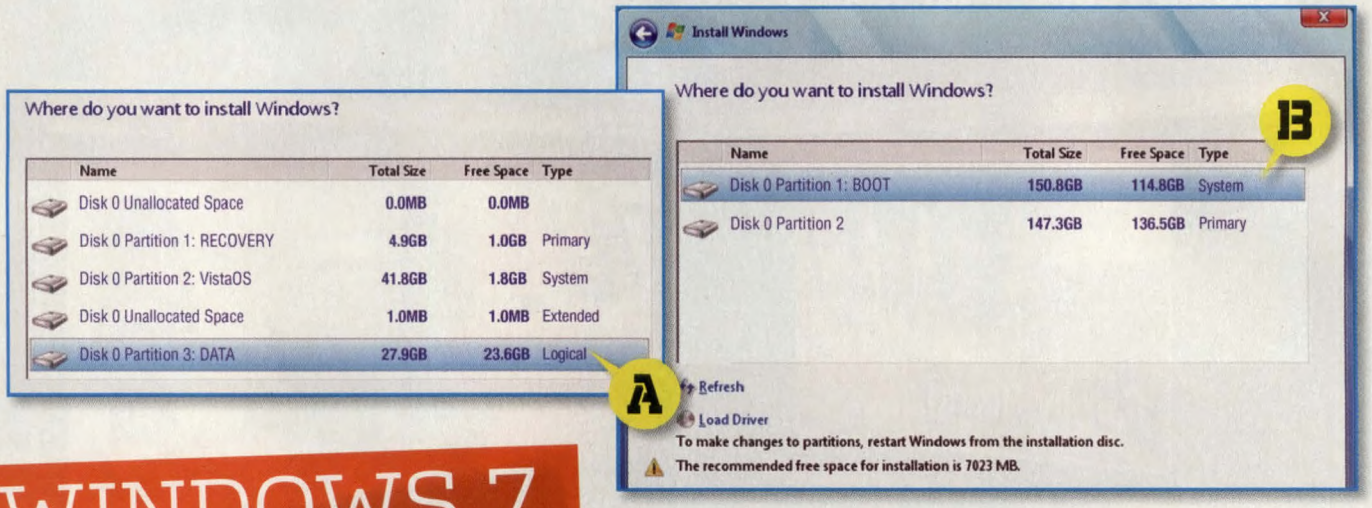


WINDOWS 7

PARTITIONING FOR CLEAN INSTALLS

A clean install is a cinch, but it's important to get the disk partitioning right.

A clean install means you give Windows 7 a chance to install itself cleanly on your disk without inheriting any legacy configurations, applications (and problems).

As with Windows Vista, the Windows 7 installation process makes full use of the Windows Preinstallation Environment (Windows PE), which automates much of the install and leaves you to make only a few choices.

It's really dead simple — you boot your system from the Windows 7 DVD, follow the initial prompts, select Custom for which type of installation you want to perform and follow the script.

However, you will reach a point in the installation process where you are asked where you want to install the OS. You are shown a graphical representation of your system's physical hard drives and the various partitions on them.

This stage can be confusing for many users, since the picture of the hard drives shown by the Windows 7 installer will vary from PC to PC, depending on what previous OS was installed, what recovery partitions were created by the PC vendor and how many other partitions were created by the user previously.

A The Windows 7 installer asks: "Where do you want to install Windows?" But to the owner of an ASUS notebook who asked us for help, the answer was not immediately obvious.

The screenshot shows a classic notebook partitioning scheme. In this case, ASUS had created a recovery partition (which contains the files to reinstall the OS, Vista), the OS partition itself, and a partition for the data. The notebook's owner had no idea on what partition she should install Windows 7.

B Another example is above — there are just two partitions on this hard disk. One is a boot partition, the other a data partition.

In these and other varied partition schemes, the simple approach would be to use the Windows 7 installer to delete the pre-existing partitions and let Windows 7 have its way with your hard disk (click on Drive Options (Advanced), highlight and delete all the partitions and then press Next).

However, it's worth pointing out that it's better to partition the drive so that the operating system (with applications) and the data are separated into their own partitions.

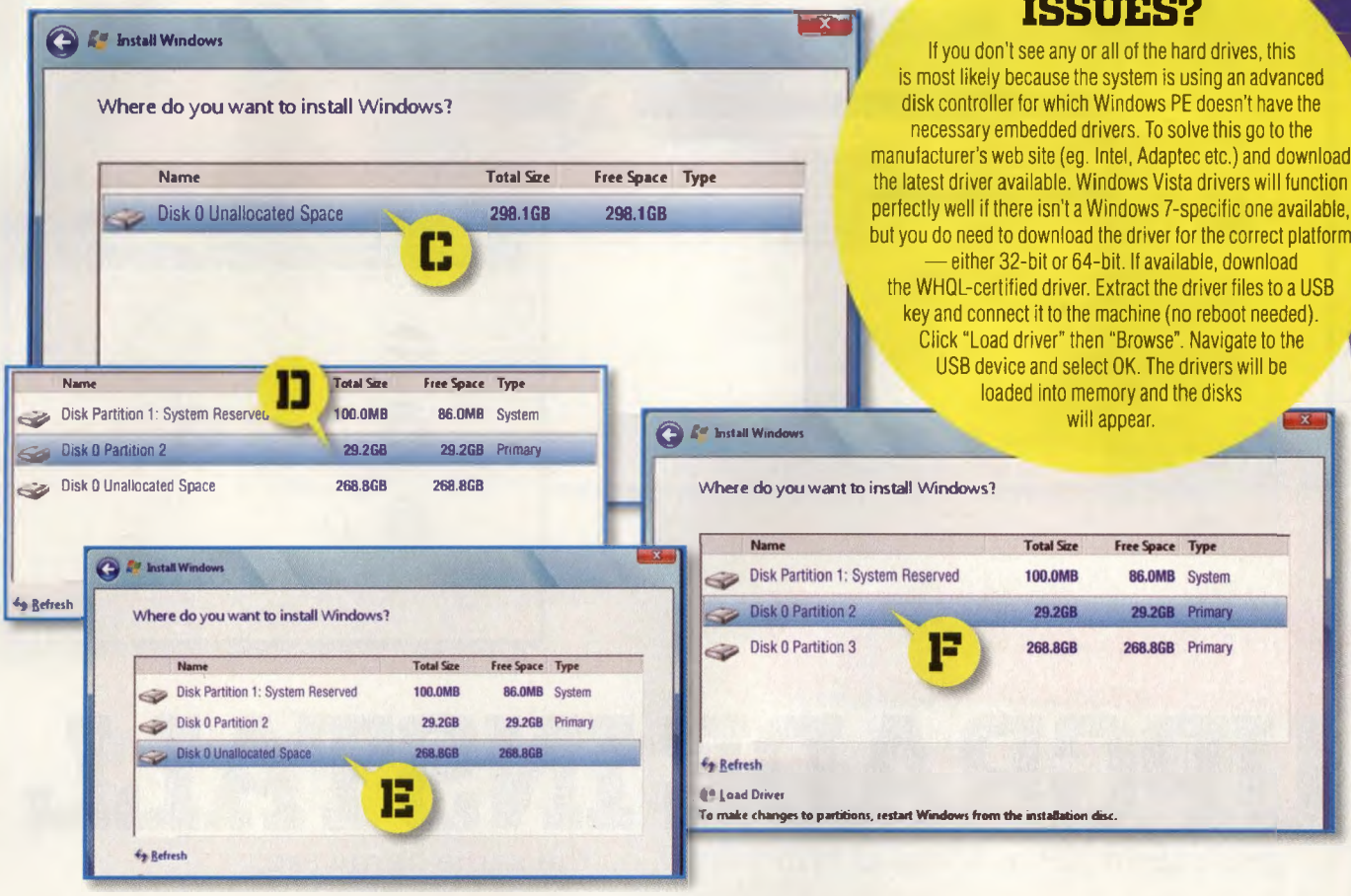
Partitioning is not so much an issue if you have more than one hard drive in your PC, since you can devote one to the OS, another to applications and so on. But if you have just the one, there are sound reasons for dividing it into multiple partitions (where each partition equals a volume, ie. Drive C, Drive D etc.).

A big one is that if your OS crashes, you can just reformat the partition it sits in and reinstall (or re-image) the OS without affecting the data on the other partition. On a single partition, this would be impossible — you'd lose the data when reinstalling the OS.

Improved access times is another reason. By placing the OS in an early (first or second partition) the OS is deposited closer to edge of the hard disk platter, where data access is faster because the head can cover more of the spinning platter in the same amount of time. Data, which is accessed less frequently, can go into subsequent partitions in the slower, inner, parts of the drive.

If you were to use just one partition for the whole disk, defragmentation over time could drag parts of the OS onto the slower parts of the drive, which leads us to another advantage of multiple partitions — it's easier for Windows 7 to defrag a partition than an entire drive since it has less files to move around.

The number of partitions can vary depending on what you want to do. Some people have



DRIVER ISSUES?

If you don't see any or all of the hard drives, this is most likely because the system is using an advanced disk controller for which Windows PE doesn't have the necessary embedded drivers. To solve this go to the manufacturer's web site (eg. Intel, Adaptec etc.) and download the latest driver available. Windows Vista drivers will function perfectly well if there isn't a Windows 7-specific one available, but you do need to download the driver for the correct platform — either 32-bit or 64-bit. If available, download the WHQL-certified driver. Extract the driver files to a USB key and connect it to the machine (no reboot needed). Click "Load driver" then "Browse". Navigate to the USB device and select OK. The drivers will be loaded into memory and the disks will appear.

separate partitions for OS, applications, data, games, even scratch files (if they work with large graphics or video files). In our example, we're going to partition a single drive for Windows 7. We'll divide it into two partitions, one for the OS and applications and one for data, but you should feel free to create more if needed.

Windows 7 requires around 10GB of hard drive space. We're planning to keep applications in the same partition as well, so we'll generously add another 20GB, making it a 30GB OS partition. The rest of the disk can be turned into another partition for data.

1 At the point when Windows 7 shows you your hard disk's structure, you can manually delete pre-existing partitions by going into Drive Options. Let's say you want Windows 7 to be housed on a 30GB partition 0 (drive C), but your data on drive D (partition 1).

C Go into Drive Options and delete any existing partitions. Highlight the now unallocated space and, in the Size field below, type in the size you want for the operating system partition (remember, a gigabyte is a 1,000MB). In this case, 30GB, so 30,000MB. Click Apply.

2 The Windows installer creates the partition (and it will also create a 100MB reserved partition at the front of the disk). This is to house the necessary components to run BitLocker drive encryption and is created regardless of the version of Windows you are installing.

D The rationale is that if you ever want to use BitLocker, you don't have to do any post-install partition modification.

3 Next, highlight the remaining unallocated space. The size field should have the remaining space automatically inserted.

E Click new. The installer will now that turn unallocated space into a partition ready for data.

4 You are now ready to install Windows 7 — but at this point, don't forget to move the highlight back onto the partition where you want the operating system installed.

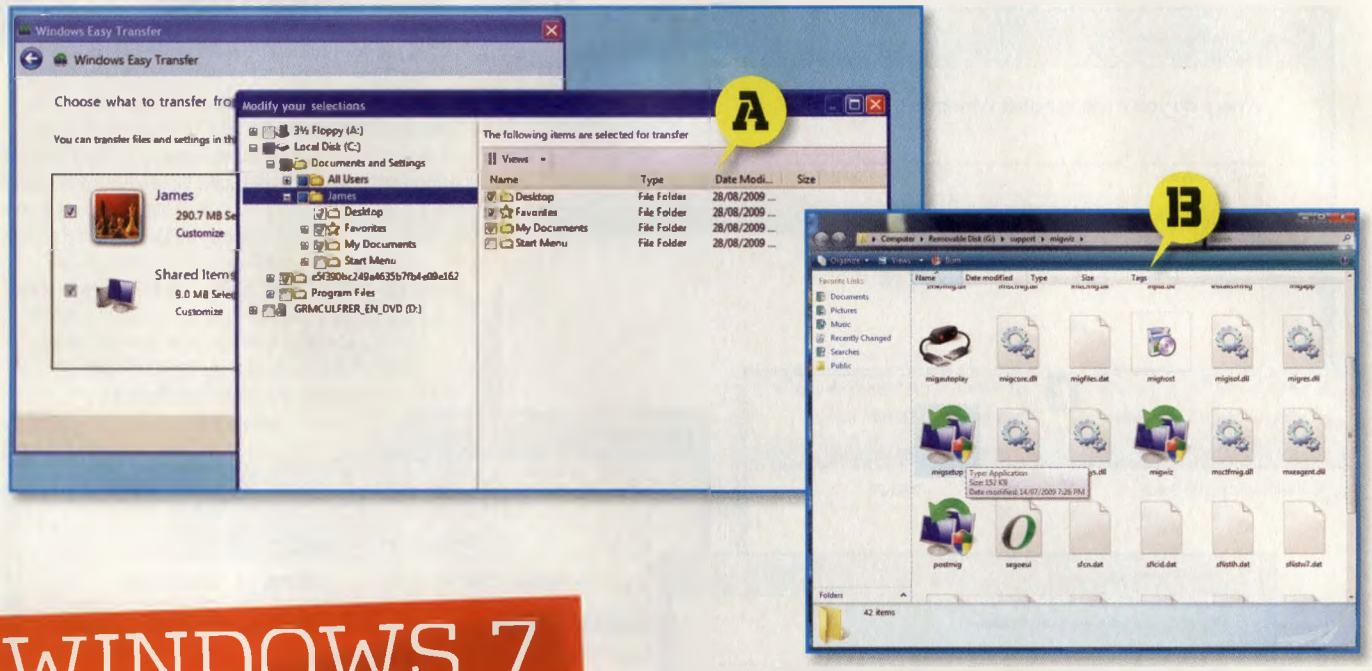
F The correct partition field is Disk 0 partition 2, the one with 30GB of space.

5 Once installed, enter a username and computer name — this is the hostname and should be unique to your network. Click Next. Type in and confirm a password and password hint. Click Next.

Choose an option for Automatic Updates preferences, select the correct time and time zone and click Next.

6 If the machine is connected to the wired network you'll get a prompt about choosing the current location — Home, Work or Public. If you've got a wireless network connection you'll be prompted to select a network within range or set up a new SSID. Again there will be a location prompt. If you choose Home network (as most will), you'll be prompted to set up a new Homegroup or connect to an existing one. You can skip this step and connect later via 'Control Panel > Network and Internet > Homegroup'.

And that's it — Windows 7 is installed. Jump on to Windows Update to get the latest OS and hardware drivers, and click on "Find out more" next to "Get updates for other Microsoft products". This will give you access to add-ons like Windows Live, Silverlight and Office updates.



WINDOWS 7 UPGRADE INSTALL

Upgrade from XP or Vista to Windows 7, on the same hardware.

There are couple of ways to upgrade to Windows 7 from an existing Windows installation — a side-by-side migration if you have XP or an in-place upgrade if you have Vista.

You can't do a seamless upgrade from Windows XP to Windows 7. As a result, Microsoft employs what it calls "Side-by-side migration," which really just consists of copying the user data and preferences from the old OS to a clean install of the new. The whole process provides a quick path to getting up and running without spending ages setting up preferences all over again. The downside with it is that you can only migrate data, not applications, and application-specific data (like Word templates, Outlook email or Adobe Reader preferences) mean that those same applications have to be installed before the data can be restored.

SIDE-BY-SIDE MIGRATION

A side-by-side migration is useful for upgrading from Windows XP, as you can't perform an in-place upgrade from XP to Windows 7 or from any earlier version of Windows (even though upgrade pricing is available for existing XP customers). This is done using Windows Easy Transfer, which is included on the Windows 7 DVD. This process also works on Windows Vista if you choose not to do an in-place upgrade.

A First boot into Windows and insert the Windows 7 DVD. Then cancel the autorun screen and navigate to the DVD in Windows Explorer.

B Go to the \support\migwiz folder and launch MIGSETUP.EXE.

C You'll get three options for the migration :
1. A direct connection between two PCs if installing from an old to a new PC,using an Easy Transfer cable
2. A network connection
3. An external/network storage location.

The last option is convenient when the old and new systems are actually the same machine, so you can restore all the user information after a clean install of Windows 7 — simply double-click on the transfer file to initiate the data restore.

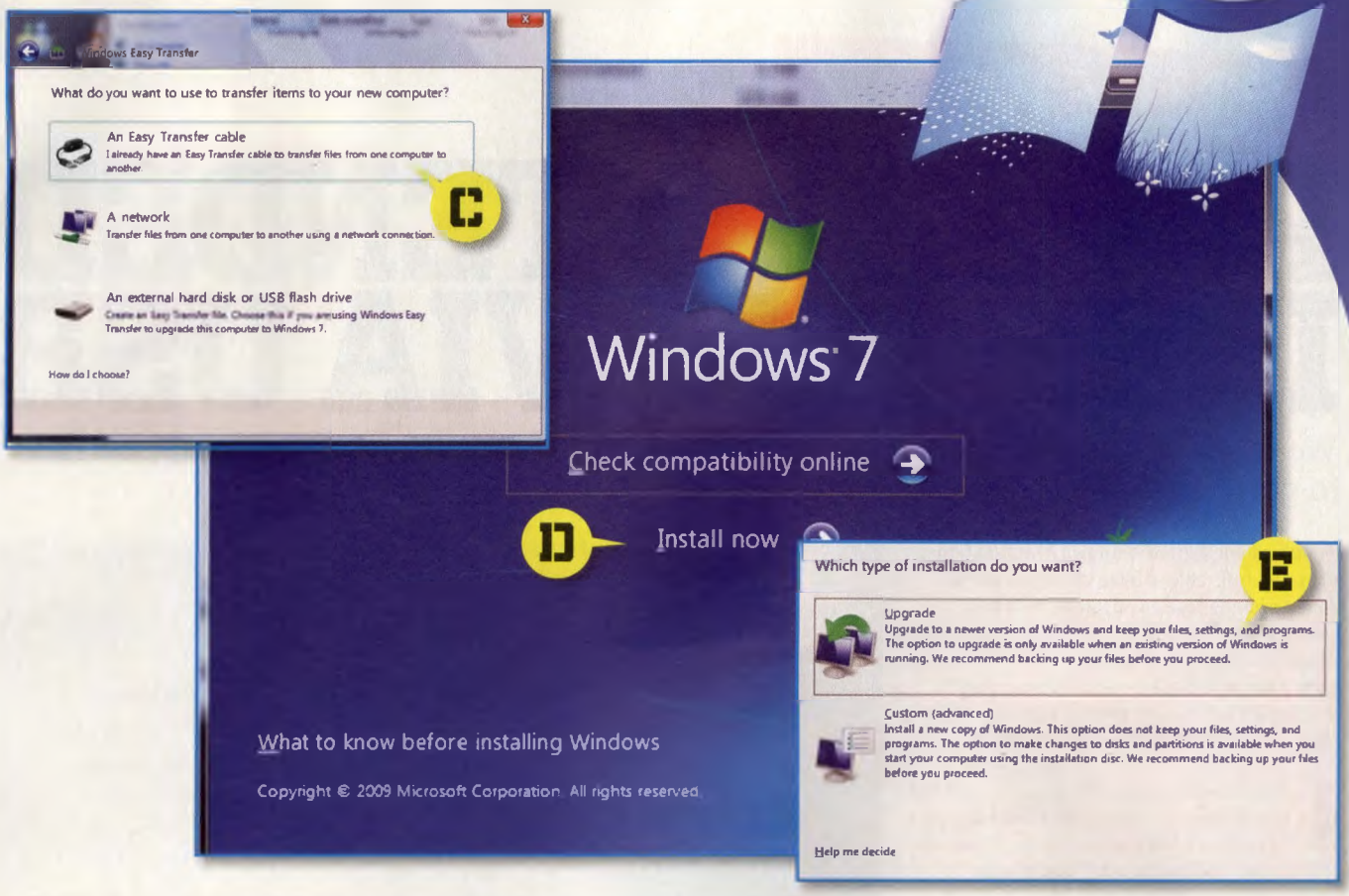
Easy Transfer will assess to see what can be transferred from the old system, and you can then pick and choose which user account and profile components should be part of the backup, as well as add in additional local data folders.

IN-PLACE UPGRADE

An in-place upgrade is possible because Windows 7 is, like Windows Vista, based on the WIM image format. This means that it can install itself over the top of an existing operating system in a non-destructive manner, maintaining user data as well as installed applications. This process is time-intensive but offers a far richer upgrade experience, and works on both physical and virtual machines.

Be aware that there are certain limitations on upgrade paths from Windows Vista, cross-platform upgrades (eg. 32-bit to 64-bit) are not supported, and the operating system cannot be upgraded from one language build to another.

You also can't upgrade from pre-RTM builds of Windows 7, so if you're running the M3, beta or RC versions then the only option is for a clean install. If you're running Windows XP and really don't want to have to perform a clean


Windows Easy Transfer
What do you want to use to transfer items to your new computer?
An Easy Transfer cable
I already have an Easy Transfer cable to transfer files from one computer to another.
A network
Transfer files from one computer to another using a network connection.
An external hard disk or USB flash drive
Transfer to upgrade this computer to Windows 7.
How do I choose?
C
Windows 7
Check compatibility online
D
Install now
What to know before installing Windows
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Which type of installation do you want?
E
Upgrade
Upgrade to a newer version of Windows and keep your files, settings, and programs. The option to upgrade is only available when an existing version of Windows is running. We recommend backing up your files before you proceed.
Custom (advanced)
Install a new copy of Windows. This option does not keep your files, settings, and programs. The option to make changes to disks and partitions is available when you start your computer using the installation disc. We recommend backing up your files before you proceed.
Help me decide

install of Windows 7, if you have a licensed copy of Vista it is possible to do an in-place installation of Vista and then another in-place installation to Windows 7. While technically possible, this is extremely messy and you don't get the benefits that come with a fresh Windows install.

1 To prepare for an in-place upgrade you should uninstall applications that interact at a low level with the operating system, like antivirus/antimalware, third-party firewalls/security suites and desktop skinning tools. Since these applications interact with the OS in real-time, they have the potential to disrupt or block the upgrade process. Also, these are the sorts of applications least likely to successfully migrate across to a new version of Windows. You should check with the vendor for the latest version or for a compatibility patch to reinstall once the migration has completed.

2 Ideally you should also have an active internet connection. Windows 7 will communicate back to Windows Update during the install and will download the latest software and security patches and driver updates. With a live internet connection, Windows 7 will fix any driver problems it can during the install. If the system is not online then you will need to either have pre-downloaded all the relevant driver packages for installation after the upgrade or connect to Windows Update as soon as possible.

3 Boot into Windows and then insert the Windows 7 software installation DVD. On the autorun screen click "Install Now".

D If the system is online, click to get updates during the installation. Accept the licence terms and click Next.

4 On the installation type screen, select "Upgrade". If you're upgrading from Vista Ultimate the system will pop up a notice that Ultimate Extras will be removed, as they're no longer available in Windows 7.

E Click Next and the installation process will start.

Windows 7 uses the free space on the hard drive to copy itself down to the system, back up files, settings and applications, install the new operating system and restore all the backed-up data. This obviously takes much more time than a standard clean installation, but you do get real-time information about what's going on.

Regional and locale settings are automatically migrated and applied in addition to the default language (US English). Enter the product key (or leave it blank to enter it later), choose Automatic Update settings, verify the time zone and network location and Windows will bring up the logon screen. User accounts that were available on Vista have been brought across along with the original passwords, as well as all user data and custom data folders.

Although the in-place upgrade performs a full backup, it's always worth backing up your data first, just in case. Windows Easy Transfer is always a useful backup tool in this scenario. Having said that, the in-place upgrade process from Vista to Windows 7 is impressively robust and intelligent and provides an excellent path to Windows 7.

WINDOWS 7

PRO UNATTENDED INSTALL - VIA USB

We explain how to install Windows 7 on multiple machines like a pro, and how to get Windows 7 running from a USB key.

If you're doing a lot of Windows 7 installations, then it's preferable to have the whole install done as hands-free as possible. Here we'll create a bootable USB key that automatically wipes a machine and installs Windows 7. This is a destructive process — all partitions on the primary disk of PCs on which it's being installed will be wiped and the entire disk used.

Windows 7
Windows Automated Installation Kit
Step-By-Step Deployment
Windows AIK Setup
Release Notes
ACT Download
MAP Download
MDT Download
Browse DVD
.NET Framework Setup
Welcome to Windows Automated Installation Kit
The Windows® Automated Installation Kit (Windows AIK) helps you to customize, configure, and deploy the Windows® 7 and Windows Server® 2008 R2 operating systems.
To run the Windows AIK, your technician computer mu
Windows Server® 2003 SP1, Windows Vista® SP1, Windc
2008, Windows 7, or Windows Server 2008 R2 operating

If you've got multiple machines to roll Windows 7 out to, an automated install is the way to go.

1 You'll need the latest Windows Automated Installation Kit (WAIK), from the Microsoft Download Center, as well as the Windows 7 DVD and a USB key at least 4GB in size.

2 Download and install the WAIK on a Windows-based machine. The system should be running a 32-bit version of Windows for maximum compatibility. Whereas a 32-bit machine can be used to create either 32-bit or 64-bit unattended installations, a 64-bit machine is restricted to 64-bit.

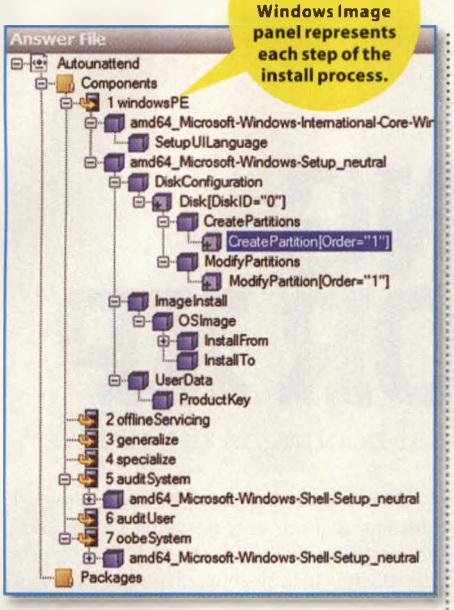
3 Next, create a folder on the hard drive that will be used for the image configuration (eg. c:\imaging). Insert the Windows 7 DVD and copy the \sources\install.wim file to c:\imaging. Then go to Start > Programs > Microsoft Windows AIK and launch Windows System Image Manager. Go to File > Select Windows Image and navigate to and select c:\imaging\install.wim. If the image contains more than one Windows 7 build then you'll be prompted to choose one you wish to work with. The program will then ask whether you want to create a catalog file — say Yes and the application will generate a new catalog, which takes a while to complete.

4 Once the WIM file has been loaded go to File > New Answer File. In the Answer File panel you'll see that there are seven sections under Components. These represent each step in the install process. In the Windows Image panel expand the Components section. These are the configurable options within the image build that can be mapped to various sections within the answer file and then assigned string values to perform a particular function during the installation. 64-bit components are prefixed with "amd64".

Go through the Components section in the Windows Image panel and right-click on each of the following options. With each option, add the setting to the relevant section in the answer file and then click into the Answer File pane and set the string values accordingly:

PASS 1 WINDOWSPE

- Microsoft-Windows-International-Core-WinPE
  - InputLocale = en-US
  - SystemLocale = AU
  - UILanguage = en-US
  - UserLocale = AU
- Microsoft-Windows-International-Core-WinPE\SetupUILanguage
  - UILanguage = en-US
- Microsoft-Windows-Setup\UserData
  - AcceptEULA = true
- Microsoft-Windows-Setup\UserData\ProductKey
  - Key = xxxxx-xxxxx-xxxxx-xxxxx-xxxxx
  - WillShowUI = OnError
- Microsoft-Windows-Setup\DiskConfiguration
  - WillShowUI = OnError
- Microsoft-Windows-Setup\DiskConfiguration\Disk
  - DiskID = 0
  - WillWipeDisk = true
- Microsoft-Windows-Setup\DiskConfiguration\Disk\CreatePartitions\CreatePartition
  - Extend = true



The components section in the Windows Image panel represents each step of the install process.

- Order = 1
- Type = Primary

- Microsoft-Windows-Setup\DiskConfiguration\Disk\ModifyPartitions\ModifyPartition
  - Active = true
  - Format = NTFS
  - Label = Windows
  - Letter = C
  - Order = 1
  - PartitionID = 1
- Microsoft-Windows-Setup\ImageInstall\OSImage
  - WillShowUI = On Error
- Microsoft-Windows-Setup\ImageInstall\OSImage\InstallTo
  - DiskID = 0
  - PartitionID = 1

PASS 4 SPECIALIZE

- Microsoft-Windows-Shell-Setup
  - ComputerName = WINDOWS7PC (or whatever you like)
  - TimeZone = AUS Eastern Standard Time (or whatever is appropriate)

PASS 5 AUDITSYSTEM

- Microsoft-Windows-Shell-Setup\UserAccounts\AdministratorPassword
  - Value = nominate a complex password

PASS 7 OOBESYSTEM

- Microsoft-Windows-Shell-Setup\OOBE
  - NetworkLocation = Home
  - ProtectYourPC = 1
- Microsoft-Windows-Shell-Setup\UserAccounts\LocalAccounts\LocalAccount
  - Action = AddListItem
  - DisplayName = type in the user's full name
  - Group = Administrators
  - Name = the username
- Microsoft-Windows-Shell-Setup\UserAccounts\LocalAccounts\Local Account\Password
  - Value = nominate a complex password

5 The above creates quite a basic unattended file. To verify that it is configured correctly, go to Tools > Verify Answer File. Some components that were added but which have not had any properties changed will be flagged in the Validation pane. Go back to the Answer File pane, find these components and delete them. Run the validation tool again and you should get the response "No warning or errors".

If the install.wim file you're using has multiple image builds within it, then the correct one will need to be specified. Go to Start > Programs > Windows AIK and select Deployment Tools Command Prompt. Type in the following command:

```
imagex /info c:\imaging\install.wim
```

This outputs the XML manifest data — track down the version of Windows 7 that you're installing and make note of the image index number. Then, add the following component to Pass 1 windowsPE in System Manager:

- Microsoft-Windows-Setup\ImageInstall\OSImage\InstallFrom\MetaData
  - Key = /IMAGE/INDEX
  - Value = # (the image index number)

6 Once complete, save the answer file as Autounattend.xml. The file is formatted as standards-compliant XML so you can edit it with any basic text editor. This is useful if you need to make changes on the fly on a system that doesn't have the WAIK installed.

7 To make the USB key bootable, attach it to a Windows system and launch the disk partition editor (Start > Run > DISKPART). Then, use the following commands to wipe and prepare the key (back up any data off it first):

```
LIST DISK (to find the USB drive)
SELECT DISK 1 (assuming this is the USB drive)
CLEAN (this wipes the disk)
CREATE PARTITION PRIMARY
SELECT PARTITION 1
ACTIVE
FORMAT FS=FAT32
ASSIGN
```

Administrator: Command Prompt - diskpart
C:\Windows\system32>diskpart
Microsoft DiskPart version 6.1.7600
Copyright (C) 1999-2008 Microsoft Corporation.
On computer: XPSM1330
DISKPART> list disk
Disk ### Status Size Free Dyn Gpt
Disk 0 Online 149 GB 0 B
Disk 1 Online 3831 MB 0 B
DISKPART> select disk 1
Disk 1 is now the selected disk.
DISKPART> clean
DiskPart succeeded in cleaning the disk.
DISKPART> create partition primary
DiskPart succeeded in creating the specified partition.
DISKPART> select part 1
Partition 1 is now the selected partition.
DISKPART> active
DiskPart marked the current partition as active.
DISKPART> format fs=fat32
100 percent completed
DiskPart successfully formatted the
DISKPART> assign
DiskPart successfully assigned the
DISKPART> _

Making a Windows 7 boot USB key is as straightforward as typing a few commands.

Exit out of DISKPART and open the USB key. Copy the entire contents of the Windows 7 installation DVD to the USB key and copy the Autounattend.xml to the root of the drive. Boot the machine from the USB key. Most systems have the capability to boot from a USB device, but check in the BIOS if you're unsure. You may also need to press a key to initiate a post-boot menu and specifically choose the device. Don't change the boot order in the BIOS to boot from the USB key first, as the system will reboot during installation and you'll get stuck in a reboot loop.

The installer will fire up and will read the information contained within the unattend file, and all being well you won't be prompted to input any information until the system boots to the logon screen, prompting you for the username and password specified in the answer file.

From the perspective of unattended installations, this tutorial barely scratches the surface of what is possible. The WAIK can be used to create answer files for Windows Vista, Server 2008 and Server 2008 R2 as well as Windows 7. Additionally, it is designed to integrate with more advanced tools like the Microsoft Deployment Toolkit (MDT), which is another free resource, and System Center Configuration Manager, which is designed for enterprise environments to manage multiple complex image builds and embedded applications.

If you want to add more entries to the answer file, the Unattended Windows Setup Reference help file contains details on every component and package, what they're used for and where they can be placed.

WINDOWS 7

DUAL-BOOTING WITH VISTA OR XP

Want to run Windows 7 with your other Windows? Dual-booting is the answer.

If you're ready to install Windows 7 on your XP or Vista machine but still need to keep the old operating system, dual-booting is an excellent choice. The advantage of dual-booting is that you get to keep using your old OS and applications, but can access your data from the new OS. In terms of performance, the new operating system has full access to the system hardware. The downside is that your system is now host to two versions of Windows, and it takes a bit of preparation to make sure that they will play nicely together.

MAKE SOME SPACE

Regardless of which operating system is currently in place, you'll need to make room for Windows 7. There are two ways of doing this:

1 The easiest method is simply to install another hard drive and dedicate it to the new OS.

2 If a second drive is not practical or possible, space will need to be freed up on the existing hard drive. There are a couple of ways of doing this — using the Shrink command in Windows Computer Management if you have Vista, or by using a partition editor like GParted if you have Windows XP.

BEST OPTION FOR VISTA: SHRINK

Shrink is a command available in Windows Vista but not in Windows XP. It queries the selected disk partition for how much space can be reclaimed and then makes that new space available as a blank section on the disk. It's a non-destructive process and won't harm existing data, and can also be used on BitLocker-encrypted volumes. Having said that, because the installation process modifies the bootloader, this will cause BitLocker to fail, so if you've enabled BitLocker you will need to disable it before going down this path. Also, Shrink only works on simple or spanned volumes — you can't Shrink a software-defined striped, mirrored or RAID-5 volume. A hardware-based RAID array presents to Windows as a basic disk, so it can be shrunk.

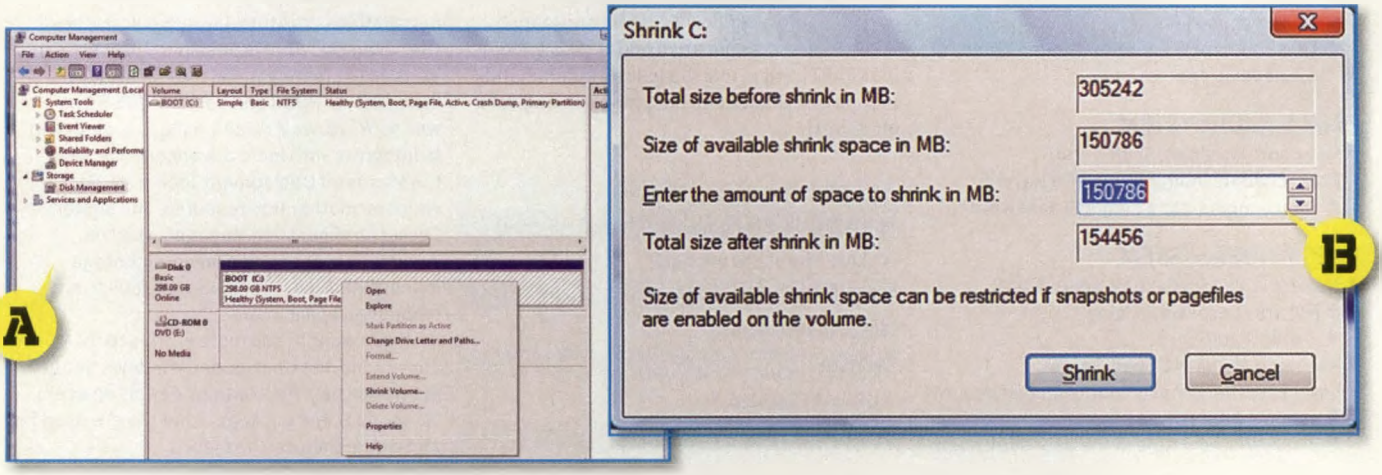
Before launching Shrink, however, it's worth cleaning up the drive to be shrunk so that you can reclaim as much space as possible for your new OS. Run Disk cleanup, to remove all unnecessary files, and then defrag the drive to consolidate free space. When ready, follow the steps below:

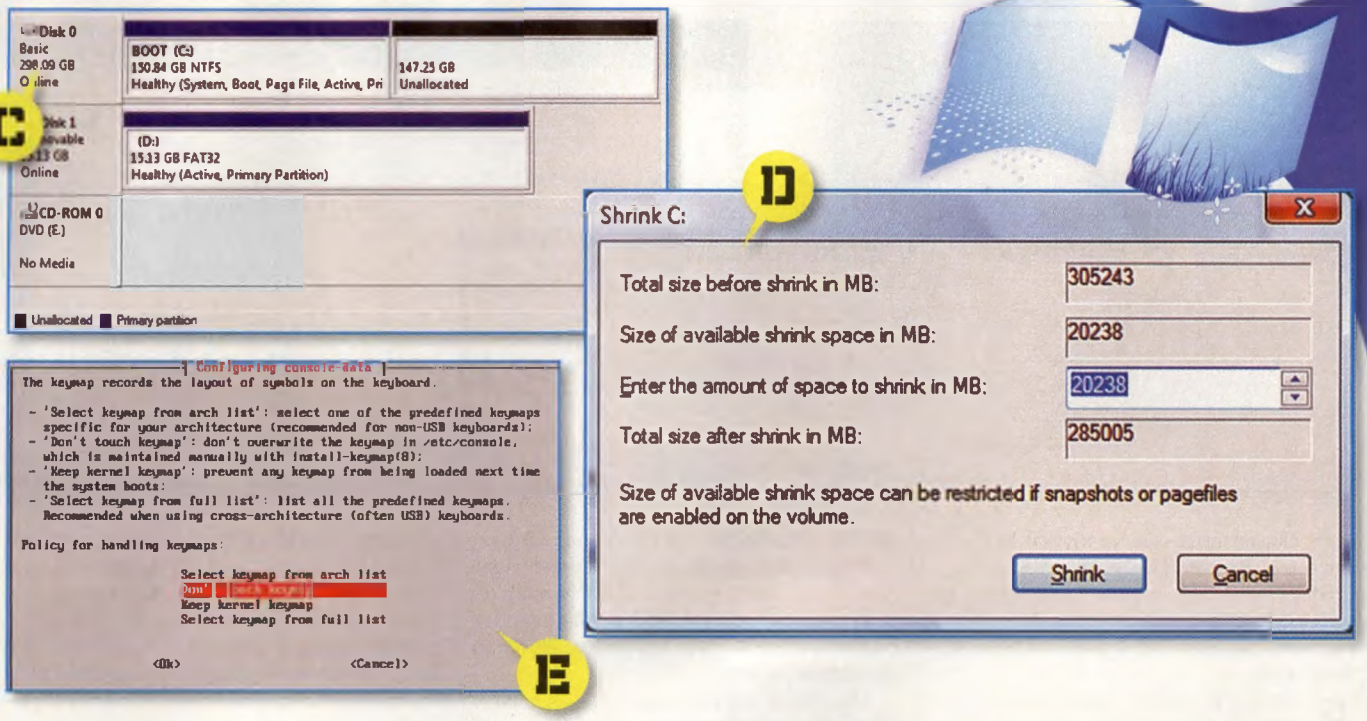
1 Access Shrink via Computer Management (it's also accessible as a command-line option in DISKPART, but in this case we'll stick with the GUI version.) Right-click Computer and select "Manage" then navigate to Disk Management.

2 Right-click the volume on which you want to reclaim space and select "Shrink Volume".

A The application will query the volume for potential Shrink space and then produces a report.

3 The report will show the total size of your disk before the Shrink is applied. In 'Size of Available Shrink Space' it shows what you can reclaim as free space.




Disk 0
Basic
298.09 GB
Online
BOOT (C:)
130.84 GB NTFS
Healthy (System, Boot, Page File, Active, Pri
147.25 GB
Unallocated
Disk 1
Removable
14.13 GB
Online
(D:)
15.33 GB FAT32
Healthy (Active, Primary Partition)
CD-ROM 0
DVD (E:)
No Media
Unallocated
Primary partition
Shrink C:
Total size before shrink in MB:
305243
Size of available shrink space in MB:
20238
Enter the amount of space to shrink in MB:
20238
Total size after shrink in MB:
285005
Size of available shrink space can be restricted if snapshots or pagefiles are enabled on the volume.
Shrink
Cancel
Configuring console-data
The keymap records the layout of symbols on the keyboard.
- 'Select keymap from arch list': select one of the predefined keymaps specific for your architecture (recommended for non-USB keyboards);
- 'Don't touch keymap': don't overwrite the keymap in /etc/console, which is maintained manually with install-keymap(8);
- 'Keep kernel keymap': prevent any keymap from being loaded next time the system boots;
- 'Select keymap from full list': list all the predefined keymaps. Recommended when using cross-architecture (often USB) keyboards.
Policy for handling keymaps:
Select keymap from arch list
Don't touch keymap
Keep kernel keymap
Select keymap from full list
<Ok>
<Cancel>

By default, it places this entire amount in the 'Enter the Amount of Space to Shrink' field.

4 If necessary, change the amount of space you want to reclaim (at least 10GB for Windows 7).

Then click "Shrink".

Shrink will eventually show the reclaimed space as an unallocated segment next to the original partition.

5 In most cases, Shrink will offer to reclaim an amount of space that's close to the actual free space on the drive (right click on drive and select Properties to see how much free space is actually on it).

However, Shrink may not give you all the space that appears to be available. System restore snapshots and the pagefile (which holds temporary data being swapped in and out of memory) will reduce the amount of space available to reclaim.

A simple way of clawing back some space is to delete system restore snapshots. To do this, either turn off System Restore (right-click Computer > Properties > System Protection, untick each disk) or delete the snapshots (Computer, right-click C:> Properties > Disk Cleanup > "File from all users on this computer" > More Options > System Restore – Clean up). Run the Shrink Volume query again and you'll find you should be able to get more space back.

6 In some cases, Shrink may offer only a tiny fraction of the space available, even allowing for the space taken by system restore snaspshots, pagefile and kernel dumps.

That's because if Shrink encounters an immovable file on the partition to be shrunk, it will stop there and not reclaim space beyond it. In one example, we tried to shrink the single pre-existing partition on a notebook's hard drive, and Shrink would only reclaim 20GBs when 150GB were actually available on the drive. If you strike the problem where Shrink won't reclaim anything like the actual space available on your drive, then it's most likely run into an immovable file (this could be a pagefile, hibernation file or master table file locked by the operating system, which can't be moved elsewhere on the disk). In this case, your best bet is to disable the page file, kernel dump, and system restore, and run a defragger like PerfectDisk 10 to move immovable files and consolidate the free space (just remember to renable everyting once you've done this).

BEST OPTION FOR XP: GPARTED

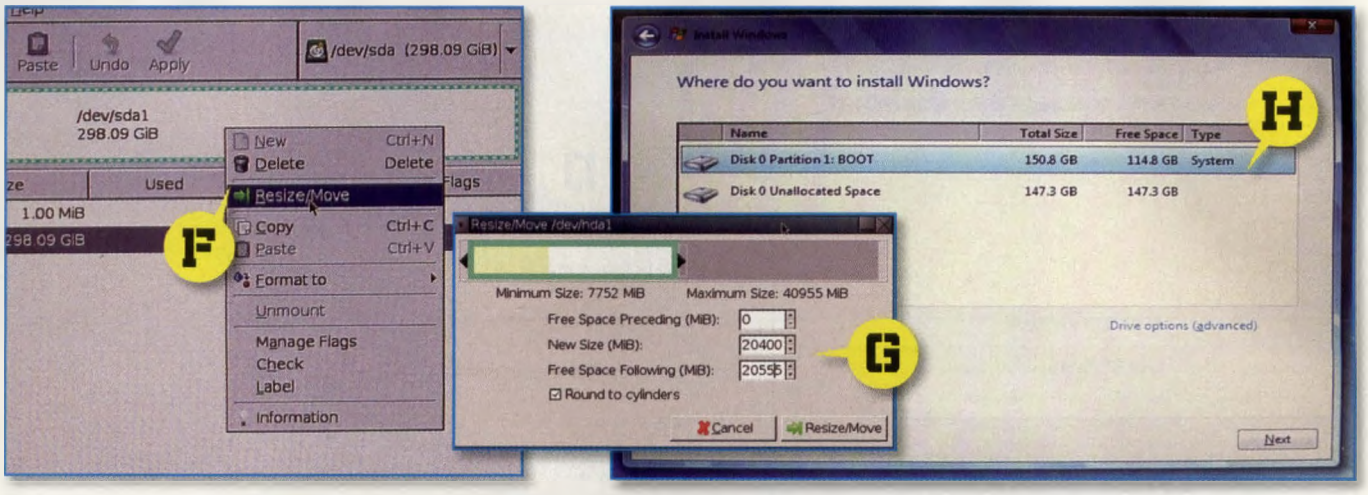
We recommend Shrink for shrinking the Vista partition because it's part of Windows and proper use of it is not likely to lead to disaster. But Shrink is not available for XP, so we have to rely on an external partition editor. The best bet is GParted, the GNOME Partition Editor, a powerful open source application. The advantage of using GParted is that it presents an intuitive graphical interface so you know precisely how changes are being implemented, and it also supports multiple filesystem formats so it can be used across a variety of operating systems. It's also the easiest way to partition your disks for dual-booting Windows 7 with Windows XP.

Although it's a GNU/Linux application, GParted can be used on a Windows system by using the Live version, which is a self-contained bootable environment that takes over your PC and runs GParted. It can be run from an ISO, USB or hard drive, or can also be made available via PXE. For ease of use the Live CD is the best option. Download the latest build from **http://gparted.sourceforge.net/livecd.php** and burn the image to disc.

Given that GParted Live makes significant changes which the underlying operating system isn't aware of, it's highly recommended to make a backup of your critical data. GParted is very robust and stable, but the last thing you want is corrupted partition data.

1 Burn the ISO to CD and use it to boot the system. During boot, press ENTER three times to accept the defaults for keymap, language and graphics settings.

2 When the main GUI loads, right-click the partition that you want to resize (probably /dev/hda1,



depending on the system configuration) and select "Resize/Move". F

Move the slider to reduce the partition size to free up enough room for Windows 7 (at least 10GB) and click "Resize/Move" again.

G At this point the changes haven't been made — the application has simply created a sequential list of tasks to be run.

3 Click Apply and then OK to confirm the changes.

DUAL-BOOTING WINDOWS 7

DUAL-BOOTING FROM A SECOND DRIVE

The process here is very simple — insert the Windows 7 discs and install to the second drive as if you're doing a clean install. Windows 7 will then scan the other drives for existing operating systems and present you with a dual-boot screen.

DUAL-BOOTING FROM EXTRA SPACE

Now that you've freed up the extra space, it's time to install Windows 7.

1 Boot from the installation media and step through the installation screens (making sure you select a Custom installation rather than Upgrade) until you get to the screen that asks "Where do you want to install Windows?"

2 On this screen you should see at least two entries — a partition on a physical disk (this is where the original operating system is still installed) and a block of free space on the same disk.

3 Choose this free space and click Next to kick off the installer. It's important to note that unlike with a normal clean installation, when Windows 7 installs in a dual-boot environment it won't automatically create the 100MB partition for BitLocker.

There's nothing special to do at this point, just let the installation run all the way through. Once completed the system will restart and boot into Windows 7.

4 As part of its installation, Windows 7 will replace the previous Windows boot-loader and incorporate the other operating system as a new entry within its own boot menu.

H Windows 7 will be the default option and the other OS will be secondary.

IF YOU'RE DUAL-BOOTING WINDOWS XP

When you boot into Windows 7 after dual-booting with either Windows XP or Vista, you'll see that the original partition containing the old operating system is visible as D:\ drive within Windows Explorer and you can access all the folders on that drive. Vista and Windows 7 use a very similar folder structure, so it's a good idea to label the drives within Explorer (right-click the Drive > Properties) so that you know wnich one is which. Restart the machine and boot into either XP or Vista and you'll see that the Windows 7 partition is also visible and accessible via Explorer.

This gives you the ability to access data stored on each system, but there's also a danger of inadvertently damaging the other operating system. Windows offers a certain degree of protection of its system files against accidental change, but this doesn't extend to a non-system disk, and from the perspective of the active OS, only the C: drive is a system disk.

Additionally, although it's possible to share data and files between operating systems, you can't share most applications. Some simple applications which run locally and which don't have any hooks into the operating system can be launched from any location — portable/USB applications are a good example. However, applications that use scripted installs, copy files to folders within the operating system and write data to the registry are restricted to the operating system they've been installed on, and while the data and files might be accessible from the second OS in a dual-boot environment, the application will not run. It's also not possible to target an application installation across operating systems — for example, you can't install an application to the Windows Vista partition while Windows 7 is active.

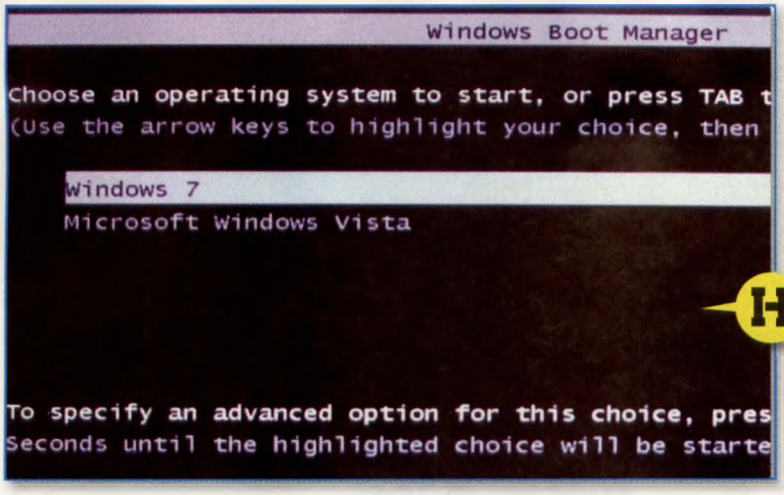
If you're dual-booting with Windows XP, you'll notice that the boot entry for XP is "Earlier version of Windows". To change this label to something a bit more descriptive, boot into Windows 7 and launch an elevated command prompt (Start > Programs > Accessories, right-click Command Prompt > "Run as administrator") then type in the following command:

```
bcdedit /v
```

This outputs the current configuration of the boot manager, and you'll see that Windows XP is being handled by the Windows Legacy OS Loader. In the entry for Windows XP, make note of the identifier — we'll use that to change the description. It's a good idea to back up the bootloader before making any changes:

```
bcdedit /export c:\temp\bcd-backup-01
```

The location is personal preference, and there is no file extension needed. Now, to change the description, type in:


Windows Boot Manager
Choose an operating system to start, or press TAB t
(Use the arrow keys to highlight your choice, then
Windows 7
Microsoft Windows Vista
To specify an advanced option for this choice, pres
Seconds until the highlighted choice will be starte

```
bcdedit /set {GUID} DESCRIPTION "Windows XP"
```

The {GUID} entry is the long text string given as the identifier. The command needs to include the curly brackets and quotation marks. Run 'bcdedit /v' again to verify that the change has been made.

By default, Windows 7 will load after the timeout if no selection is made. If you want to change the default operating system, use the following syntax:

```
bcdedit /default {GUID}
```

Where {GUID} is the identifier of the preferred OS.

BACK TO SINGLE BOOT

If at some point you decide that dual-booting isn't the way to go, it's possible to roll back the clock. The issue is that the Windows 7 bootloader takes over from the previous version (especially in the case of Windows XP), so the trick is to reinstate the original bootloader.

For Windows XP you'll need the original XP installation media. Boot the system and when the install menu loads, press R to launch a Recovery Console. There will be two options that you can log in to — the first one will be Windows XP (C:\WINDOWS in uppercase as opposed to C:\Windows). Type in the administrator password if there is one and then run the following command:

```
bootcfg /rebuild
```

This will scan for appropriate operating systems and will return one result. Press Y to add the install to the boot list. Then when prompted for the Load Identifier type in "Windows XP Professional", and for the OS Load Option type in "/fastdetect". No quotation marks. Then type in:

```
fixboot – press Y to confirm
fixmbr – press Y to confirm
```

Then type in "exit" to reboot the machine. Now, only the Windows XP bootloader is present, but there is a second entry in the boot.ini. Boot into Windows XP, then right-click My Computer and select Properties. Then go to Advanced > Startup and Recovery > Settings and click Edit under "Default operating system". Remove one of the entries in the boot.ini under [operating system], save and close. The next time you restart the machine it will boot straight into XP without presenting a boot menu.

The Windows 7 partition is still accessible via Windows Explorer. To remove the partition go into Computer Management (right-click My Computer > Manage) and navigate to Windows Explorer. Right-click the Windows 7 partition and select "Delete Partition". You can't reclaim the space from within Windows XP, so you'll need to either use GPartEd or DISKPART on the Windows 7 DVD to resize the volume.

Windows Vista is a lot easier because Vista and Windows 7 use a compatible bootloader. To remove Windows 7 from the dual-booting scenario with Vista, boot into Vista and then launch an elevated command prompt. Export the bootloader config before continuing as a safeguard. Type in 'bcdedit' to look at the non-verbose output.

As you can see, Windows 7 is defined as {default} and Vista is {current}. To make Vista the only entry in the bootloader use the following command:

```
bcdedit /default {current}
```

Run 'bcdedit' to look at the config. Vista is now the default boot entry, but Windows 7 is no longer defined as {default} and rather has a long GUID string. To remove this entry, type in:

```
bcdedit /delete {GUID} /cleanup
```

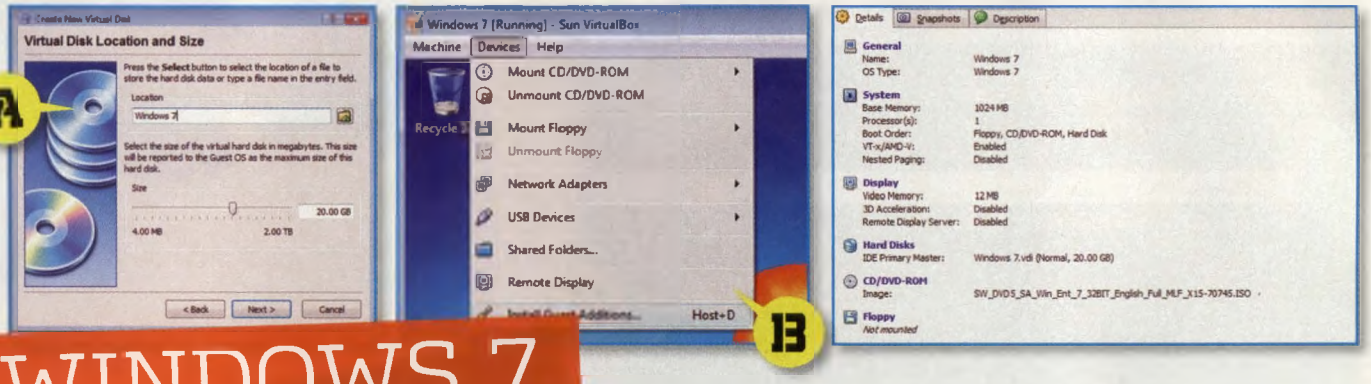
Check the config again and now Windows Vista is the only boot entry. Restart the machine and the system will boot straight into Vista. Then, use either Disk Management or DISKPART to remove the Windows 7 partition and extend the original Vista partition to reclaim the space. To do this using DISKPART use the following commands:

```
SELECT DISK 0
LIST PART
SELECT PART 2 (assuming this is the Windows 7 partition)
DELETE PART
SELECT PART 1
EXTEND
```

Exit the application and go back into Windows Explorer. The Windows 7 partition will be gone and the Vista partition will be fully reinstated.

In either dual-booting scenario you can also use the procedure outlined above for removing the older operating system, leaving only Windows 7 in place. Simply boot into Windows 7 and use the bcdedit commands to remove the other boot entry. Delete the partition and extend the Windows 7 partition to fill the disk.

Dual-booting can be fairly complex, but it is a powerful approach to multi-operating system management. It also gives you the ability to move to Windows 7 as a staggered migration with the option to back out.



WINDOWS 7 VIRTUAL BOX

Run Windows 7 alongside your existing OS without dual-booting.

If you want to get to grips with Windows 7 without dedicating a physical machine to a new installation or by dual-booting, virtualisation is a great way to go. Sun's VirtualBox virtualisation software supports Windows 7 as a guest OS, and because it's free, it's a great choice for anyone interested in experimenting.

A virtualised OS does most things one installed on your hard drive does — the only caveat being that your system needs plenty of memory to give both OSs enough room to do their thing.

You can virtualise both 32-bit and 64-bit versions of Windows 7. 64-bit VMs are supported on a 32-bit host, but 64-bit VMs always require hardware virtualisation support. Check the system BIOS to see whether your CPU supports either Intel VT-x or AMD-V, and if so make sure it's enabled. If not you can still run 32-bit VMs but not 64-bit.

1 Download and install the latest version of VirtualBox and have the Windows 7 installation media handy — either the DVD or a downloaded ISO. Launch VirtualBox and click New to create a new virtual machine.

2 Type in a machine name and choose Windows 7 (either 32-bit or 64-bit) from the drop-down menu and click Next. Assign at least 1,024MB of RAM to the machine and click Next again.

3 When prompted to create a new virtual hard disk make sure that "Boot Hard Disk" and "Create new hard disk" are ticked and click Next.

4 Choose either a dynamically expanding or fixed size disk. Dynamically expanding disks take up less drive space but don't have the performance of a fixed disk.

A Assign at least 20GB to the disk and name it something appropriate. Click Next > Finish and the disk is created.

5 In the details tab of the new VM, click on Display. Assign at least 64MB of video memory to the VM and enable 3D acceleration. This isn't strictly necessary, but will give much better UI performance. Click OK to exit.

6 Click on CD\DVD-ROM and tick "Mount CD/DVD Drive". To install from physical media select "Host CD/DVD Drive" and select the appropriate drive letter.

13 To install from an ISO select "ISO image file" and click the folder icon.

7 In the Virtual Media Manager select Add and browse for and select the Windows 7 ISO image. Click OK to confirm and then select Start to launch the new VM, which will power on and boot from the attached media.

8 You'll have to click into the VM to interact with it, as no integration components are yet installed. The VM will capture both keyboard and mouse, but you can press RIGHT-CTRL to bring the input devices back to the host (this is known as the host button).

The Windows 7 installer will load — simply perform a standard clean installation.

Once the operating system is installed you need to install the integration components to give the VM access to the host hardware and resources.

9 Press RIGHT-CTRL to get out of the VM, select the Devices menu and choose "Install Guest Additions", then click back into the VM. This unmounts the Windows 7 media and will load a VirtualBox media image with all the necessary integration software included.

10 Load the application from Windows Explorer or from autorun. Accept all the installation defaults then reboot once it's complete. The guest additions mean that the VM won't capture the mouse away from the host and gives proper access to the underlying graphics and USB hardware.

THINGS TO REMEMBER

Taking snapshots is useful for testing software as you can easily roll back to a previous state should something new destabilise the operating system. To do this go to Machine > Take Snapshot, or simply press HOST+S.

Aero Glass isn't available in VirtualBox due to the requirement for DirectX support. Additionally, if you're going to keep the VM for a while, the operating system will need to be activated.

Our Eee PC scored well enough to run the slick Aero UI.

WINDOWS 7

NETBOOK BOOST

Should Windows 7 be on a netbook? Yes, says netbook addict, David Flynn.

If you've got one of the few netbooks running Vista, upgrading to Windows 7 is a no-brainer. It's faster and more stable, gobbles less RAM and generally boasts a degree of polish that Vista should have had from Day One. In essence, Windows 7 gives you Vista's better traits without the trauma. And if you've got XP on your netbook there are also plenty of compelling reasons to move to 7 — one being that both operating systems are almost on par when it comes to their performance and battery life.

Plus, there are many netbook-friendly optimisations, such as support for solid state drives, better windows management through the improved taskbar and the ability to enjoy Aero mode even with a netbook's modest integrated graphics. Finally, running Windows 7 on your netbook as well as your other home PCs means you can use 7's in-built HomeGroup networking to share files, folders, printers and storage devices. HomeGroup won't work with any version of Windows prior to 7 — but it will detect another Windows 7 machine with ease, making it the definitive networking technology for non-technical users.

To show how how easy it is to make the move, we loaded and optimised Windows 7 on a shiny, new XP-based ASUS Eee PC.

WHICH SKU FOR YOU?

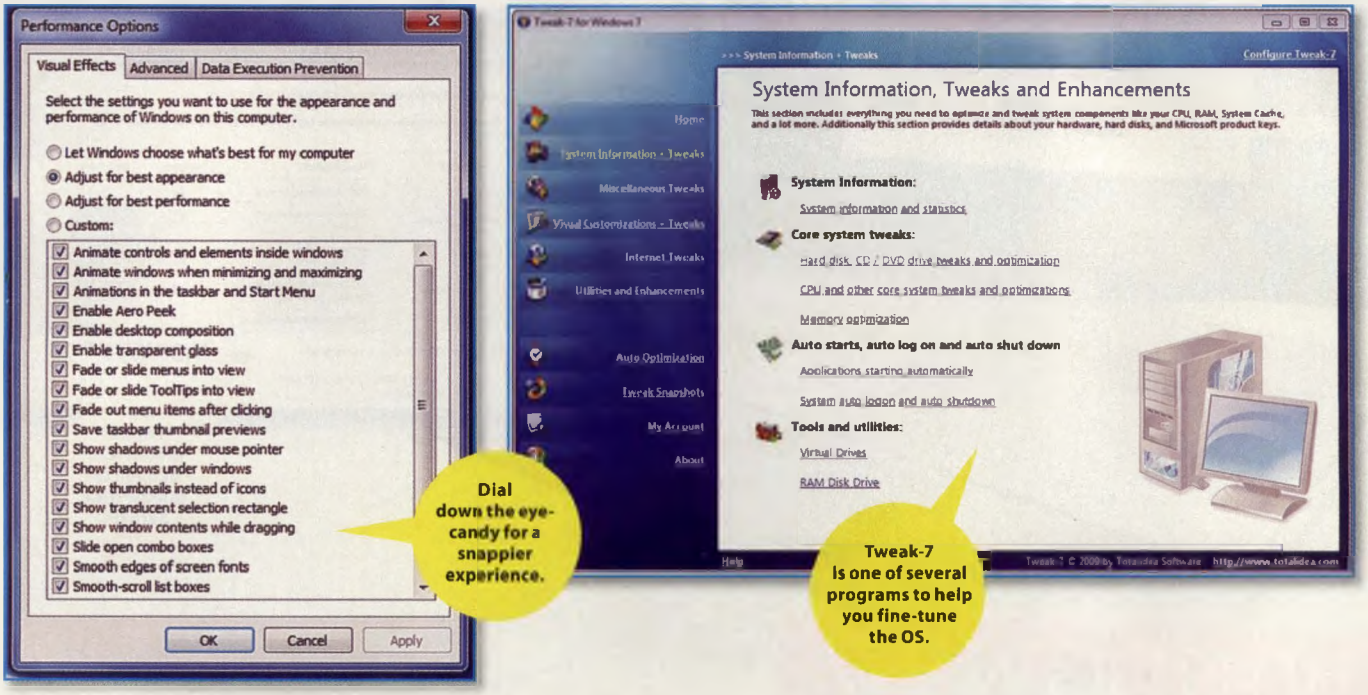
Microsoft is restricting Windows 7 Starter and Home Basic editions to OEMs, and that's a good thing — they lack too many features for any self-respecting *APC* reader. Your choices should be between Home Premium, Professional and Ultimate. Don't be concerned that a high-end OS edition will load more than it needs at startup. Across all editions Microsoft has kept the Windows startup services pared down to a minimum. Each edition also needs the same amount of disk space (around 8GB) because Microsoft loads the entire Windows 7 feature set so that features can be unlocked under the Windows Anytime Upgrade plan. Windows 7 Home Premium will be sufficient for many netbook users, but our money is on Professional because it packs a few useful tricks up its sleeve.

'Presentation mode' lets you control the netbook's behaviour while you're giving a presentation. It deactivates the screensaver, displays a different wallpaper (swap that swimsuit model for a clean corporate image) and stops pop-up notifications such as email and IM alerts. You can also write Windows Backup sets to a network, join a domain and encrypt the file system.

Of course, if you've got easy access to Windows 7 Ultimate, then you may as well go the whole hog.

PRE-INSTALL CHECKLIST

Some of the drivers loaded by Windows 7 will run fine — this usually includes drivers for wireless and the webcam. But it's vital that you hunt down all the necessary drivers for your netbook, along with vendor-specific utilities. Vista-class drivers will do fine unless the vendor has already released Windows 7 versions of each package. In addition to checking your netbook maker's site, don't forget Intel (**www.intel.com/support/detect.htm**) for the chipset and other components. Be warned: without drivers and utilities written for Vista or Windows 7, your notebook may not only lose key functionality, the battery life could be noticeably reduced.


Performance Options
Visual Effects
Advanced
Data Execution Prevention
Select the settings you want to use for the appearance and performance of Windows on this computer.
Let Windows choose what's best for my computer
Adjust for best appearance
Adjust for best performance
Custom:
Animate controls and elements inside windows
Animate windows when minimizing and maximizing
Animations in the taskbar and Start Menu
Enable Aero Peek
Enable desktop composition
Enable transparent glass
Fade or slide menus into view
Fade or slide ToolTips into view
Fade out menu items after clicking
Save taskbar thumbnail previews
Show shadows under mouse pointer
Show shadows under windows
Show thumbnails instead of icons
Show translucent selection rectangle
Show window contents while dragging
Slide open combo boxes
Smooth edges of screen fonts
Smooth-scroll list boxes
OK
Cancel
Apply
Dial down the eye-candy for a snappier experience.
System Information, Tweaks and Enhancements
System Information:
Core system tweaks:
Auto starts, auto log on and auto shut down
Tools and utilities:
Tweak-7 is one of several programs to help you fine-tune the OS.

LOCK AND LOAD...

While Windows 7 offers a seamless upgrade from Vista, it won't directly upgrade XP. But you don't need to resort to nuking the hard drive for a clean install — 7 very considerately shifts your XP user and system folders into a newly-created WINDOWS.OLD directory (provided there's enough room on the netbook's drive, of course). This makes it easy to reinstate your documents, bookmarks, email and assorted settings files. That said, you might want to back them up *just in case*. And the final code is much easier to install over XP than the early beta and RC builds. Simply copy the contents of the Windows 7 DVD onto a 4GB USB flash drive, make sure your netbook's hard drive has sufficient elbow room (we'd suggest at least 10GB) and run the Setup file. If after installing Windows 7 you need disk space in a hurry, copy the WINDOWS.OLD folder onto a USB drive and delete it from the netbook.

SPEED IT UP

Even with the bog-standard Atom processor and Intel integrated graphics our Eee PC delivered a Windows Experience Index score of 2.0, which was sufficient to run the Windows 7 Aero UI in all it glassy, glossy goodness. But Aero's transparency effects come with a noticeable performance hit — the OS just isn't as responsive and snappy as it should be.

The good news is that you can ditch the transparency but keep Aero's other benefits — such as taskbar thumbnails and Flip 3D — by selection Personalize > Windows Color and unchecking the 'Enable Transparency' box. Personalisation options permit you to kick the default theme back to Windows 7 Basic, but we don't recommend the dog-ugly Win2K-like Windows Classic mode for anyone but minimalists. Dive into the Visual Effects dialog (the easiest way to get there through the Control Panel's idiotic maze is to type 'visual effects into the Start Menu's search field) and disable the most pointless eye candy. Just don't choose 'Adjust for best performance' or you'll be dumped into the atrocious Windows Classic UI. For example, you can do without animated controls and windows, all of the 'fade' and 'slide' effects and seeing a window's contents while dragging it. Netbooks with solid state drives can also benefit from some SSD-specific tweaks — **MyDellMini.com** has a set of useful suggestions for the popular Dell Mini 9, for instance (**tinyurl.com/mpzync**).

SLAP DOWN SERVICES

Windows 7 loads far fewer background services on startup than either Vista or XP, so there's less work to do here. You'll find a detailed guide to Windows 7 services at **BlackViper.com** (**tinyurl.com/dbcs7d**). Hit Win+R and enter services.msc to call up the Services management console (or use msconfig.exe and click the Services tab). Right-click any unwanted service that's running, select Properties and change the Startup type to Disabled, then hit the Stop button.

WIN BACK HARD DISK SPACE

Once you've reinstated your documents and any program settings, delete the WINDOWS.OLD directory. Reduce the size of the Recycle Bin by right-clicking the Bin and choosing Properties — this is especially handy if you've got a solid state drive, because every spare gigabyte helps! The System Restore claims a further 5% of the drive. Click the System Protection tab on System Properties to reduce the amount of space given over to the System Restore points or, if you're fine to fly without this safety wire, turn if off altogether.

TWEAKING TOOLS

It's also worth checking out some of the utilities designed to fine-tune the UI and tweak some deeper OS settings. These include TweakNow PowerPack 2009 (**tweaknow.com**, free); Ultimate Windows Tweaker (**winvistaclub.com**, free); XdN Tweaker (**xenomorph.net**, free); Windows 7 Manager (**yamicsoft.com**, US$30) and Tweak-7 (**totalidea.com**, US$40).

NETBOOK KNOW-HOW

You can bet that netbook community sites will soon be packed with tips on installing and optimising Windows 7 for specific models. For ASUS Eee PCs, visit **eeeuser.com**; Acer Aspire One, **aspireoneuser.com**; Dell Mini series, **mydellmini.com**; HP, **hp2133guide.com**; and for the MSI Wind, **msiwind.net**.

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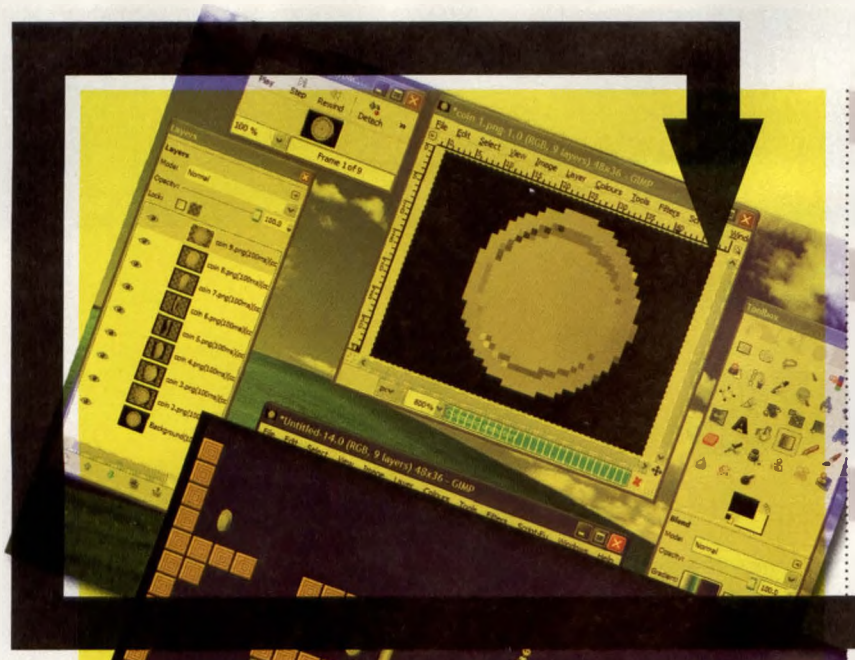
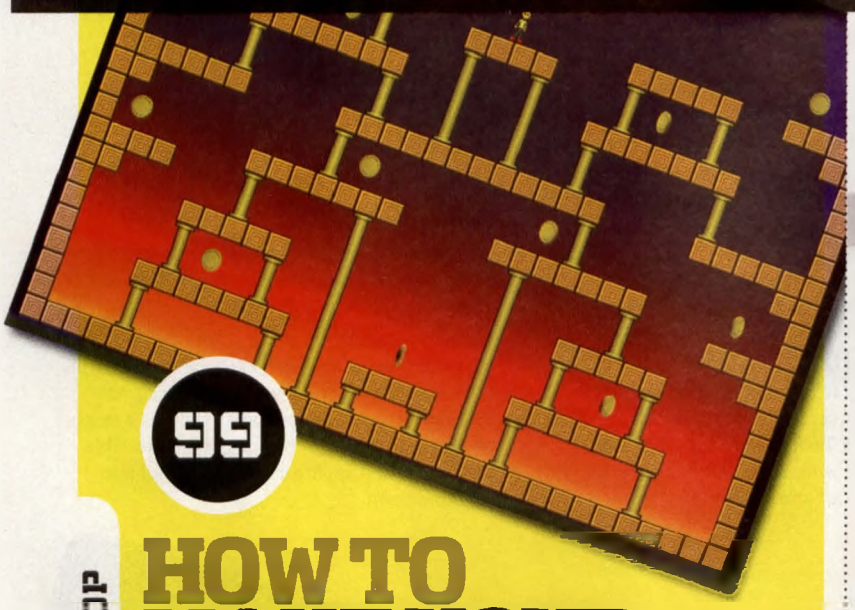
PROJECTS, TIPS AND TRICKS





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WORKSHOP

HOW TO MAKE YOUR OWN PC GAMES!

In part one of this Workshop you'll learn to use Gamemaker in order to create top-flight indie games. APC shows you how!

QUICK TIPS

Tech tips plus reader questions and answers. **84**

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84 quicktips
HELP AND ADVICE

quicktips@acpmagazines.com.au

Have you solved a tech problem or found a better way of doing things with your computer? Share your information with other *APC* readers by sending it in as a tip to quicktips@acpmagazines.com.au, together with your name, contact number and 20-word bio. Each month we'll award a prize to the best tip (see prize below). Alternately, if you have a technical question post it online on our forums at **apcmag.com/forums** and other readers may be able to solve it.

Windows 7 tips

Once you've installed Windows 7, these tips will help you tune it to perfection.

LAUNCHER

FASTER PROGRAM LAUNCHES

If you've launched one instance of a program but want to start another, don't work your way back through the Start menu. It's quicker to hold down [Shift] and click on the program's icon (or middle-click it). Windows 7 will start a new instance for you.

START MENU

SPEEDY VIDEO ACCESS

Want faster access to your Videos folder? Windows 7 now lets you add it to the Start menu. Right-click the Start orb, click 'Properties > Start Menu > Customize' and set the Videos option to 'Display as a link'. If you have got a TV tuner that works with Windows 7, you'll appreciate the new option to display the Recorded TV folder on the Start menu, too.

INTERNET

RUN WEB SEARCHES

The Windows 7 search tool can be extended to search online resources, assuming someone creates an appropriate search connector. To add, say, Flickr support visit **www.istartedsomething.com/flickrsearch/**, click on 'Download the Connector' and choose the 'Open' option. A 'Flickr Search' option will be added to your Searches folder. A number of ready-made searches can be downloaded from **www.thewindowsclub.com**.

DOWNLOADS

SCHEDULE DOWNLOADS

You can now tell Windows Media Center to download data at a specific time. Launch Media Center, go to 'Tasks > Settings > General > Automatic Download Options' and set the download start and stop times.

ROBOCOPY

MULTITHREADED ROBOCOPIES

If you've used the excellent command-line Robocopy tool, you'll appreciate Windows 7's new switches. Our favourite, '/MT', improves speed by carrying out multithreaded copies using the number of threads you specify. Enter 'robocopy /?' at a command line for the full details.

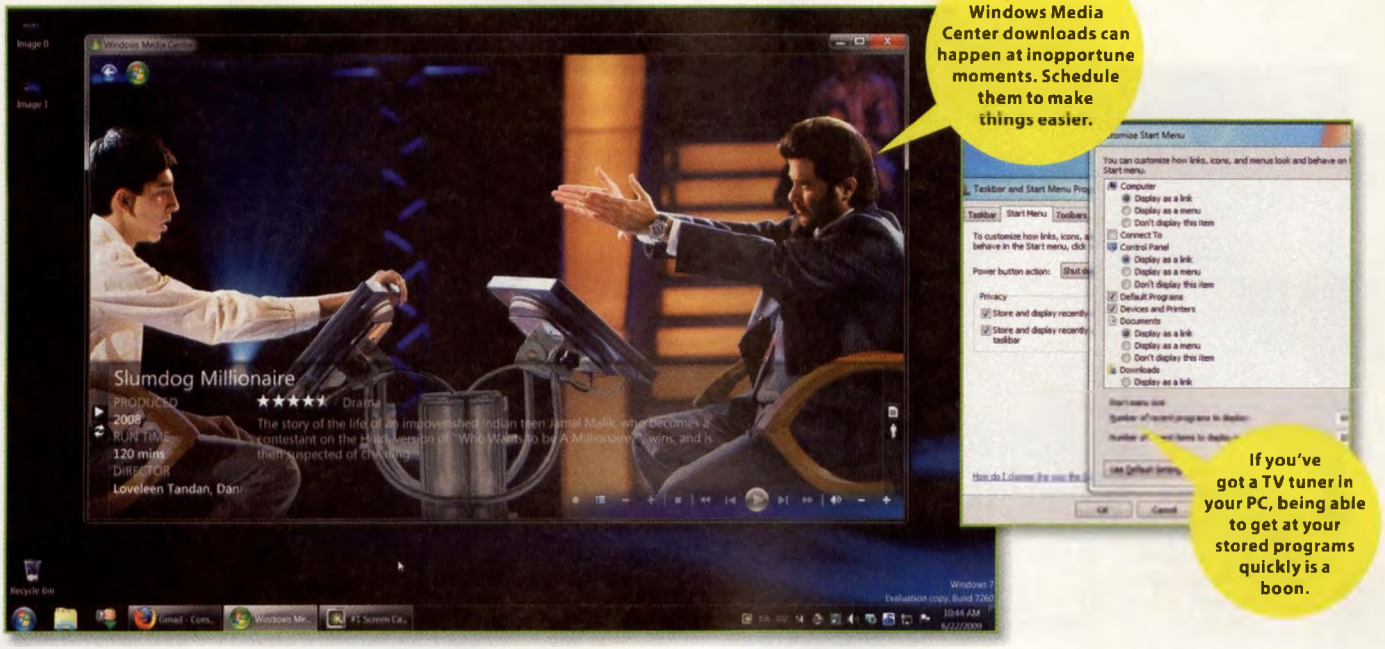
EXPLORER

AN [ALT]+[TAB] ALTERNATIVE

Try holding down the [Ctrl] key when you click on the Explorer icon. Windows 7 will then cycle through Explorer windows only, which is a much quicker way to locate the one you're after. This works with any application that has multiple windows open.

AND THE WINNER IS: JOHN MULLINS

Whether you are a digital photography nut, into designing avatars or need a more intuitive way to mark up documents, the Bamboo Fun tablet from Wacom is for you. It uses a pressure-sensitive pen to navigate, draw, write, retouch, and paint. Adobe Photoshop Elements and Corel Painter Essentials come bundled for beginners, while confident users will find the Bamboo Fun unlocks the advanced pressure-sensitive features in their favourite applications. RRP: $299 (Bamboo Fun Medium). Available from **www.wacom.com.au**. John Mullins, from Perth, provided the Transfer Windows 7 DVD to a USB tip.


By default Windows Media Center downloads can happen at inopportune moments. Schedule them to make things easier.
If you've got a TV tuner in your PC, being able to get at your stored programs quickly is a boon.
Slumdog Millionaire

CLEAN UP

PARALLEL DEFRAGS

The standard Windows 7 defragger offers a little more control than we saw in Vista, and the command line version also has some interesting new features. The '/r' switch will defrag multiple drives in parallel (they'll obviously need to be physically separate drives for this to be useful). The '/h' switch runs the defrag at a higher than normal priority, and the '/u' switch provides regular progress reports so you can see exactly what's going on. Enter the command defrag /c /h /u /r in a command window to speedily defrag a system with multiple drives, or enter 'defrag /?' to view the new options for yourself.

GADGETS

REALLY REMOVE THE SIDEBAR

You might think Windows 7 has dispensed with the sidebar, but you'd be wrong. Gadgets are still hosted by the 'sidebar.exe' process, it's just that this is now launched automatically when Windows boots. If you're not a fan, disable gadgets temporarily by launching 'msconfig.exe', clicking the Startup tab and clearing the box next to the 'Startup' entry.

SECURITY ALERTS

BLOCK ANNOYING ALERTS

Just like Vista, Windows 7 will display a suitably stern warning if it thinks that your antivirus, firewall or other security settings are incorrect. But unlike with Vista, if you disagree with some of Windows 7's recommendations then you can turn off alerts on individual topics. If you no longer want to see warnings just because you've dared to turn off the Windows firewall, say, then click 'Control Panel > System and Security > Action Center > Change Action Center settings', clear the 'Network Firewall' box and then click 'OK'.

INTERNET

LOAD IE FASTER

Some Internet Explorer add-ons can take a while to start, dragging down the browser's performance, but at least IE8 can now point a finger at the worst resource hogs. Click 'Tools > Manage Add-ons' and check the Load Time (which is shown in the right-hand column), to see which of the browser extensions you've currently got installed are the most slothful.

ICONS

AUTO ARRANGE YOUR DESKTOP

If your desktop has icons scattered everywhere then you could right-click it and select 'View > Auto Arrange', just as in Vista. But a simpler solution is just to press and hold down [F5], and Windows will automatically arrange your icons for you.

DESKTOP

RSS-POWERED WALLPAPER

If you want to give Windows 7 more of a personal feel, try piping your wallpapers in by RSS. To take a look at some existing example feeds visit **www.bit.ly/3l8jir**. For some more adventurous examples, visit **www.bit.ly/12rdmT**. Here you'll find some new themes for Windows 7 that display the latest news and weather on your desktop.

TASK BAR

RECOVER SCREEN SPACE

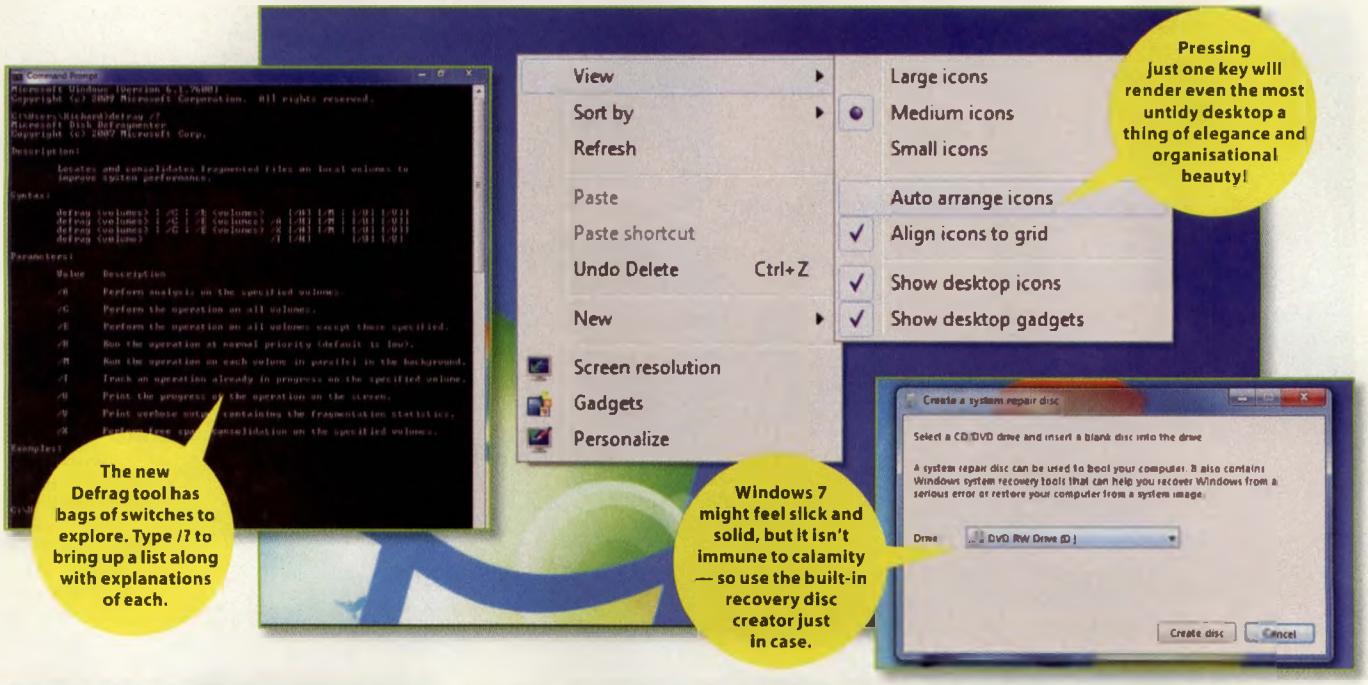
The new Windows 7 taskbar acts like a big Quick Launch toolbar that can hold whatever program shortcuts you like (just right-click on one and select 'Pin to Taskbar'). It's great, but it does consume a little more screen real estate than we'd ideally like. Shrink it to a more manageable size by right-clicking the Start orb and then navigating to 'Properties > TaskBar > Use Small Icons > OK'.

QUICK LAUNCH

RESTORE THE QUICK LAUNCH TOOLBAR

If you're unhappy with the new taskbar, the good news is that it only takes a moment to restore the old Quick Launch toolbar. Right-click the taskbar, choose 'Toolbars > New Toolbar' and type '%UserProfile%\AppData\Roaming\Microsoft\Internet Explorer\Quick Launch' into the Folder box.

Next, click 'Select Folder'. Now right-click the taskbar, clear the 'Lock the Taskbar box' and you should see the Quick Launch toolbar, probably to the right. Right-click its divider and then clear 'Show Text' and 'Show Title' to minimise the amount of space it takes up. Complete the job by right-clicking the bar and selecting 'View > Small Icons' for the true retro Windows look.


The new Defrag tool has bags of switches to explore. Type /? to bring up a list along with explanations of each.
View
Sort by
Refresh
Paste
Paste shortcut
Undo Delete Ctrl+Z
New
Screen resolution
Gadgets
Personalize
Large icons
Medium icons
Small icons
Auto arrange icons
Align icons to grid
Show desktop icons
Show desktop gadgets
Pressing just one key will render even the most untidy desktop a thing of elegance and organisational beauty!
Windows 7 might feel slick and solid, but it isn't immune to calamity — so use the built-in recovery disc creator just in case.
Create a system repair disc
Select a CD/DVD drive and insert a blank disc into the drive
A system repair disc can be used to boot your computer. It also contains Windows system recovery tools that can help you recover Windows from a serious error or restore your computer from a system image.
Drive:
DVD RW Drive (D:)
Create disc
Cancel

POWER

CUSTOM POWER SWITCH

By default, Windows 7 displays a plaintext 'Shut down' button on the Start menu, but it'll only take you a few moments to change this action to something else. If you find yourself rebooting your PC a few times every day, then it might make more sense to have that set as the default action. To make that happen, simply right-click the Start orb, select 'Properties' and set the Power Boot Action to 'Restart'.

OLD-STYLE WINDOWS

DISABLE SMART WINDOW ARRANGEMENT

Windows 7 features some new ways to intelligently arrange your windows, so that (for example) if you drag a window to the top of the screen, it will automatically maximise. We like the new system, but if you find it distracting then it's something that can easily be disabled. Run Regedit as normal, go to 'HKEY_CURRENT_USER\Control Panel\Desktop', set 'WindowArrangementActive' to 0 and then reboot. After this you should find that your windows will behave just as they always did in Windows XP or Vista.

MONITOR

SWITCH TO A PROJECTOR

Windows 7 now provides a standard way to switch your display from one monitor to another, or even a projector. All you need to do is press [Windows]+[P] or run 'displayswitch.exe' and choose your preferred display. (This will have no effect if you've only one display connected.)

FIX ITS

TROUBLESHOOT ODD PROBLEMS

If some part of Windows 7 is behaving strangely and you don't know why, then click 'Control Panel > Find and Fix Problems' (or 'Troubleshooting') to access the new troubleshooting packs. These are simple wizards that are set up to resolve common problems, check your settings, clean up your system and more besides.

SYSTEM REPAIR

STARTUP REPAIR

If you've downloaded Windows 7 (and even if you haven't), it's a good idea to create a system repair disc straight away in case you run into problems booting the OS later on. The quickest way to begin making yours is to type 'create system repair' into the Windows search box. If the worst does happen, then using such a disc could be the only way to get your PC running again.

TASKBAR SHORTCUTS

BROWSE THROUGH THE TASKBAR

If you prefer the keyboard over the mouse, you'll find this shortcut for browsing the taskbar very handy. Press [Windows]+[T], and you'll move the focus to the left-most icon on the taskbar. Then use the arrow keys to change the focus to other icons, and you'll get a live preview of every window.

WINDOWS

TRANSFER WINDOWS BOOT DVD TO A USB

Turning a USB key into a Windows boot disk involves copying all the files across from the DVD and then making the key bootable. There is also an easier way, and that's to use a program called WintoFlash. This allows you to transfer the boot disk environment from Windows XP, Vista and Windows 7 to a USB key. All you do is tell the program where to find the Windows installation DVD and the USB key, and it does the rest, transferring the installation files and making the USB key bootable.

John Mullins

USB DRIVES

Q I have a Windows XP computer in my cafe that I allow customers to use. I'm conscious of security so I'd like to be able to prevent them using USB drives, which could be a source of malware and other unwanted installations. How would I go about doing this?

Lee Canter

A The blocking of USB drives is possible, but how you go about it depends on whether the drive has already been installed or not. If a drive is yet to be inserted, its installation and use can be blocked using the following method. Launch Windows Explorer and then navigate to C:\Windows\Inf — you'll need to ensure that system files are not hidden in order to see this folder. Locate the file named 'usbstor.inf', right-click it and select 'Properties' before moving to the Security tab.

The blocking of USB drives is possible, but it depends on whether the drive has already been installed or not.
If you want to remap the keys of your notebbok, we recommend you download KeyTweak.

Select the user account for which USB drive use should be blocked and tick the box labelled 'Deny'. Select the system user, set the same Deny option and click 'OK'. Repeat this process for the file named 'usbstor.pnf' in the Inf folder.

If a USB drive has already been installed, you can ensure that it can't be used when it's connected. Launch the Registry Editor by pressing [Windows]+[R], then type regedit and press [Enter]. Navigate to 'HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\UsbStor' and double-click the key named 'Start' in the right-hand pane.

Change the value of the key to 4 and click 'OK'. The restriction should be enforced immediately, but it's a good idea to restart Windows to make sure.

SECURITY

HOW TO DETECT BOTNETS

Q I have my computer protected by free antivirus software, which seems to do the job, but I keep reading about botnets and how they've infected thousands of computers and turned them into "zombies," with their owners unaware of this.

Glen Smith

A You don't say what security software you use, but Microsoft makes a tool specifically designed to identify the existence of botnets on your PC. Botnets are compromised computers that can be controlled by or send information to a botnet operator. They spread via a number of ways, from drive-by downloads to worms such as Blaster and Mydoom. Microsoft's Malicious Software Removal Tool is designed to spot these on a Windows computer. Download it from **tinyurl.com/bt4eq**, run it and get some peace of mind.

BROWSERS

SOFTWARE EDITING OF PAGE SOURCES IN IE8

Q Previous versions of Internet Explorer used Notepad to view page sources. Internet Explorer 8 seems to make use of a different viewer that doesn't allow editing. Can this be changed?

Paul Olds

A The default page source viewer can indeed be changed. Press [F12] in Internet Explorer to launch the Developer Tools and the source code can be viewed from here. Click 'File > Customize Internet Explorer View Source > Notepad' and close the program window. In future, clicking 'Page > View Source' will display the code in Notepad as you're used to.

HARDWARE

REMAP THE KEYBOARD

Q I have a Samsung NC10 netbook. I use the [Fn] key for various tasks such as adjusting the brightness and volume, but it's situated on the left-hand side of the keyboard. This means that the vast majority of keyboard shortcuts are two- handed operations. Would it be possible to remap my keyboard so that the right-hand [Ctrl] key, which I never use, takes over the role of the [Fn] key?

Hadley Breare

A Unfortunately, this is simply not possible. While the vast majority of keyboard keys have a scan code associated with them, this isn't the case with the [Fn] key. Instead, it can be viewed as a 'modifying' key: when it's pressed, it temporarily changes the scan code associated with the other key pressed at the same time. Perhaps your problem could be solved by remapping some of the other keys. To do this, download the free tool KeyTweak from **http://webpages.charter.net/krumsick.**

EMAIL TIP

SEND MASSIVE EMAILS

Thought I'd let you know that Yahoo has added a new feature to its mailbox that lets you attach up to 100MBs of attachments to each email. Yahoo! has done it by incorporating a service from Drop.Io service, an online private sharing service.

Hui Wang

HARDWARE

COMPUTER REPAIR FLOWCHARTS

The author of a book on computer repair flowcharts has made several of them available for free on his web site. Check them out, there's charts for troubleshooting everything from CPUs and motherboards to network troubleshooting. I've found them really useful and I am sure other readers will too. You can find them at **www.fonerbooks.com/pcrepair.htm**.

Wendy Zheng

33 insider tips

HOW THE PROFESSIONALS DO IT

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LINUX WINDOW

Karmic Koala

The next release of Ubuntu is approaching, so what's new in the upcoming 9.10 release?

APC EXPERT

ASHTON MILLS

Editor of the Linux Pocketbooks series, and now with CHOICE magazine, Ashton has been a tech journo for over 13 years, including five years with APC.

Moving on with the alphabetic alliterative naming scheme, the successor to Jaunty Jackalope will be an almost locally inspired 'Karmic Koala'. If names are anything to go by, Karmic Koala at least has a friendly feel to it compared to Jaunty Jackalope.

At the time of writing the latest development version is Alpha 5, but it's enough to get a good indication for what's coming in the final release, due October 29.

Karmic brings with it a host improvements over Jaunty. First and foremost is a 2.6.31-based kernel, which includes enhancements for improving desktop interactivity, especially when under memory pressure. Indeed, Karmic 'feels' faster, both in terms of application loading and general desktop use.

A significant range of driver updates are also bundled, including brand-spanking-new USB 3.0 support, even before any USB 3.0 motherboards and devices are available on the market. Finally, users with Intel graphics cards should see increased performance and stability as the architecture change in Jaunty has been fixed.

A nifty new graphical loading screen, while not quite as funky as the Windows 7 one, is an improvement on not having one at all before. The latest GNOME makes an appearance, of course, which in Alpha 5 is at 2.27.91 and also sports a new GDM login manager, distinctly different to all previous releases. Instead of a single username/password sign on, the user is presented with a box listing known users, any of which can have an avatar image associated with it. I'm not too sure it's actually an improvement at this stage; will have to wait for the final release.

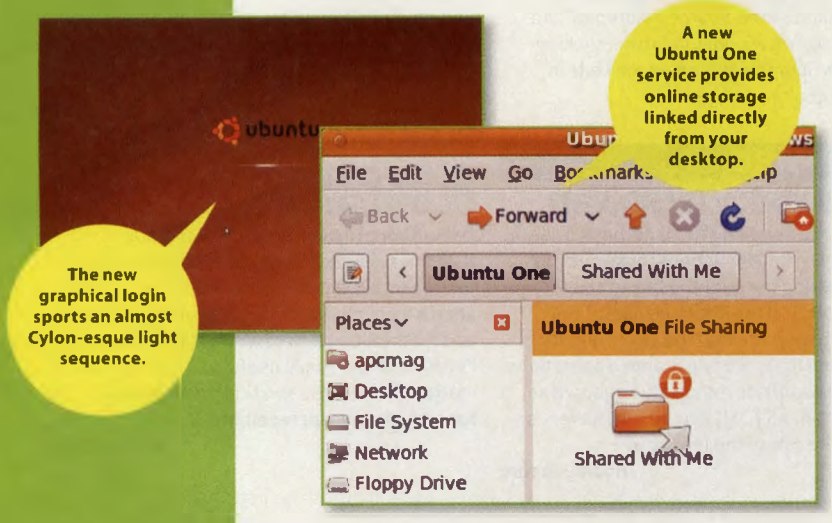
All the usual packages have seen updates, with Firefox at 3.5.4 and GCC at 4.4, while curiously the Pidgin IM program has been replaced by a new one called Empathy.

Two new Ubuntu initiatives also come with Karmic — UEC, aka. Ubuntu Enterprise Cloud, and Ubuntu One. UEC is cloud architecture designed to serve services within a company and is based around Amazon's EC2 structure. Ubuntu One is the more interesting addition, at least for desktop users — the short description would be Apple's MobileMe for Ubuntu, at least with respect to file sharing. Using Ubuntu One you can share and synchronise files between multiple computers you own, providing roaming access to your files wherever you are. Everyone using Ubuntu gets 2GB free, just by creating a login at one.ubuntu.com. More space can be had for a small monthly fee.

Finally, if you remember, Ext4 made it into Jaunty Jackalope but due to concerns of stability was not made the default filesystem for that release. Six months on, and Ubuntu 9.10 will now enable Ext4 as standard. This brings with it a slight boost to performance over Ext3 but means that, if you're used to upgrading-in-place from one version to the next, you'll be better off doing a clean install with Karmic to allow the installer to format an Ext4 partition for you.

Karmic also represents the first version where the Ubuntu Netbook Remix (UNR) will be created alongside the Ubuntu and Kubuntu variants. If you're a netbook user, you'll be able to update UNR every time a new Ubuntu release hits.

Mark Shuttleworth, at the Ubuntu Developer Summit in May, stated 'The desktop will have a designer's fingerprints all over it — we're now beginning the serious push to a new look. Brown has served us well, but the Koala is considering other options.' So far in Alpha 5, brown is still holding on, but there's a few releases yet before final. Here's hoping.



WEB DESIGN

Make a working UI with Flash Catalyst

Turn artwork created with Photoshop or Illustrator into functional user interfaces, with a new design tool from Adobe.

APC EXPERT

MARK SZULC

Mark has more than fifteen years of experience in the IT and graphic arts industries and has done everything from creating some of Australia and New Zealand's first web sites to managing technical development teams, system admin and consultancy services. When not out and about with Adobe, Mark can be found tinkering away at his own web site (*www.markszulc.com*), immersed in an online game, travelling for leisure or trying to write a new song in his home studio.

Graphic designers are being called on more and more to provide creative input into web development projects, yet they are often disappointed at the final results due to their lack of project control and the often imperfect workflow between designers and developers.

With this in mind, Adobe has released a new product that allows designers to be more involved in the workflow and gives them more control over the interaction design, instead of just leaving it to the developers. Flash Catalyst is a new creative tool that allows you take your artwork from Photoshop CS4 and Illustrator CS4 and define different states and interactions (Fireworks support is coming). The beta is currently available for free download at **www.adobe.com/go/flashcatalyst/**.

Converting your static designs into interactive experiences is easy. Open Flash Catalyst and select 'File > Import' to import your Photoshop or Illustrator artwork. This creates a Flash project that developers can work with as well, but for now we'll add some smarts without any code.

Select your objects and use the Convert Artwork to Component menu to decide between Buttons, Text Inputs, Scrollbars and more. Components such as the vertical scrollbar need a little more detail to tell Flash Catalyst which layers should be used by selecting which pieces of your artwork are the up arrow, down arrow, track and slider.

Alternatively, Flash Catalyst also has a library of components to enable wireframing and prototyping of applications without starting from a creative composition. This is great for taking those pen and paper sketches, typically static wireframes, and making them a reality.

Add some sample data by using the Data List component and the Design Time Data tab together. Select your artwork that represents how the data will look and convert it to a Data List by using the 'Convert Artwork to Component' menu option. Selecting the layers, open up the 'Design Time Data' tab to edit the data shown when previewing and even add extra information.

States are similar to pages, they show different information. Make a new state by either duplicating the current state (there is always at least one) or clicking 'New Blank State'. Use the layers panel to select what should and should not appear just like you would in other Adobe creative tools.

While you are busily creating objects and defining states, Flash Catalyst is creating default transitions. Transitions guide the user from one setting to the other and really add to the experience. Open up the timeline tab to add or modify each transition's length, order and effects, such as fade, move, resize and rotate. Use the play arrow to preview how the animation looks while you are tweaking.

Tie everything together by adding interactivity. This can be done by selecting the buttons or other navigational and interactive objects in your design and clicking the + next to the 'Custom Interactions' option on the 'Heads Up Display' and add an onClick event. Here you can select which state to move to when the button is clicked by selecting 'Play transition to state' option and selecting the state you wish to change to.

Now or at any time during your design process you can preview your work by selecting 'File > Run Project' or 'Ctrl + Enter' (Command + Enter on a Mac). Flash Catalyst will compile your project into Flash and preview it in your browser. When finished with your project, you can take these same files and either publish them to a web server for a client to review, or save as an FXP file for a developer to open and enhance using Adobe Flash Builder. apc

IPHONE HACK

Jailbreak your iPhone OS 3.0

The jailbreaking community has had to go back to the drawing board with the release of the new iPhone OS 3.0.

APC EXPERT

JENNETH ORANTIA

An expert on all things mobile, Jenneth Orantia has been writing reviews and tutorials on smartphones for the last seven years. Her current phone of choice is the iPhone 3G, but she's also well-versed in Windows Mobile, Symbian, Palm and BlackBerry.

Now that the dust has settled after its release, it's clear that iPhone OS 3.0 is easier to break. From the outset, the iPhone Dev Team (the benevolent hackers behind the 3G jailbreak) said that they'd wait for the 3.0.1 firmware before releasing a hack to ensure Apple didn't block it in the next update.

But after George Hotz, the same teenage hacker that unlocked the original iPhone, came out with an experimental jailbreak procedure called Purplera1n (which caused lots of stability issues), the iPhone Dev Team decided to step to the plate early and release a version of redsn0w that worked with OS 3.0. It also works with the latest 3.0.1 update and operates in a similar way to QuickPWN in that it jailbreaks the firmware without overwriting any of the existing data and apps on your iPhone.

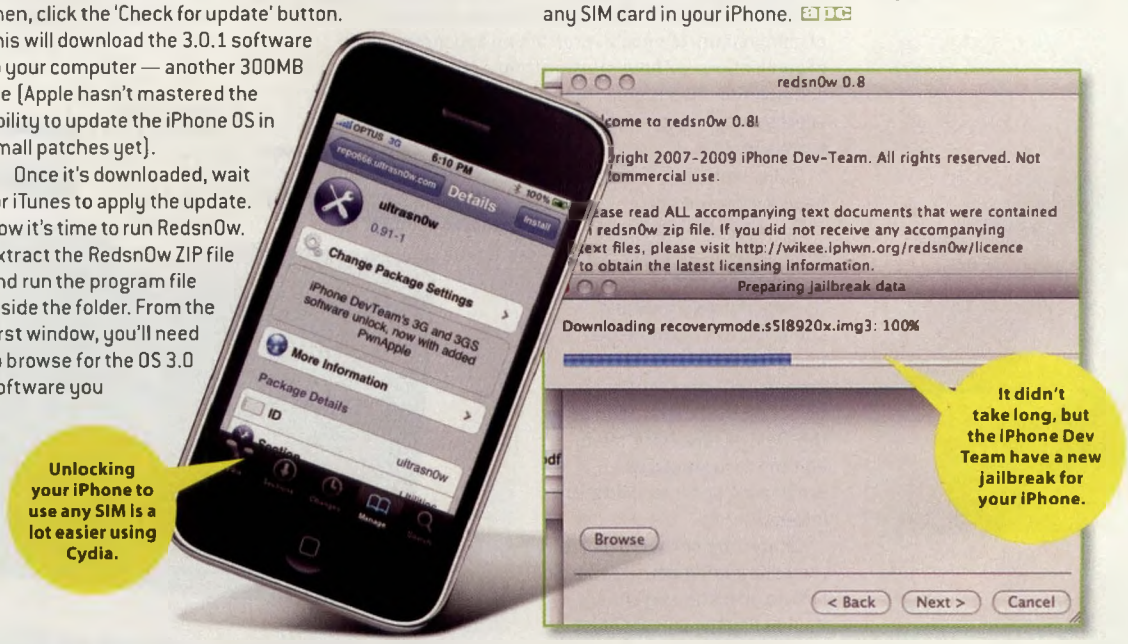
Redsn0w works on both PCs and Macs, and you can download it by following the links from **http://redsn0w.com**. You'll also need to download the iPhone OS 3.0 firmware, which Redsn0w will patch and upload to your iPhone. It's just under 300MB, and you can download it from **http://tinyurl.com/m8f77n** if you're on a 3GS or from **http://tinyurl.com/l4or8m** if you're using a 3G.

To start the process, update your iPhone to the latest 3.0.1 software via iTunes. From iTunes, highlight your iPhone in the left-hand pane and do a full sync to make sure you've got an up-to-date backup of all of your data and apps. Then, click the 'Check for update' button. This will download the 3.0.1 software to your computer — another 300MB file (Apple hasn't mastered the ability to update the iPhone OS in small patches yet).

Once it's downloaded, wait for iTunes to apply the update. Now it's time to run Redsn0w. Extract the Redsn0w ZIP file and run the program file inside the folder. From the first window, you'll need to browse for the OS 3.0 software you downloaded. Click 'Open' and wait for Redsn0w to verify that it's a legitimate IPSW file. Follow the rest of the instructions from then on. You'll get the option to install both Cydia and Icy. You'll need Cydia to install all of your jailbreak apps, and Icy is an optional interface that's cleaner and less of a resource hog than Cydia — but you can't run all of the repositories from it.

Don't fret if you don't get the recovery mode process right the first time — you can restart your iPhone (by pressing and holding on the power button at the top until you get an option to slide to power it off) and click the Back button in Redsn0w to try putting it into recovery mode again. Once you've got it in recovery mode (depicted by a picture of an iPhone cable and the iTunes symbol on your iPhone screen), Redsn0w will run the jailbreak process and automatically restart your iPhone. After it has rebooted, you'll see a new Cydia icon on your homescreen — this is the jailbreak version of the App Store.

Unlocking your iPhone so it can work with any carrier is a lot easier. Launch Cydia, go the Manage tab, tap on sources and select the 'Edit' button. Click Add and enter **http://repo666.ultrasn0w.com** (note, that's a zero in ultrasn0w). Once Cydia has verified it as a repository and updated its database, you'll be able to tap on the repo666 item and select Ultrasn0w. Install it, reboot, and you'll be able to use any SIM card in your iPhone.


Unlocking your iPhone to use any SIM is a lot easier using Cydia.
redsn0w 0.8
Preparing jailbreak data
Downloading recoverymode.s5l8920x.img3: 100%
Browse
< Back
Next >
Cancel
It didn't take long, but the iPhone Dev Team have a new jailbreak for your iPhone.

IPOD

Maximise storage on a smaller iPod

You don't need a massive iPod to always have new music to play.

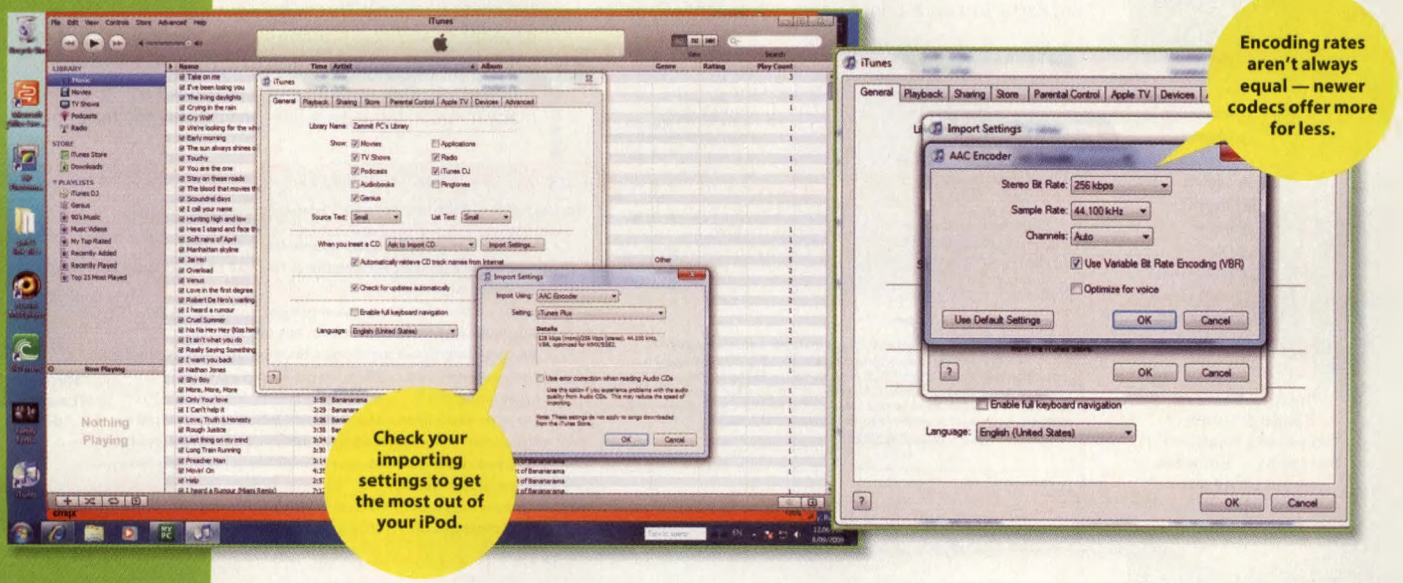
Apple's iPod classic maxes out at a sizeable 120GB — more than enough room to accommodate a healthy music collection. But not everyone wants — or can afford — Apple's larger iPod, and there are a few tricks you can use to fit more music in a smaller space and also make sure that you've always got the content you want on your iPod.

If you've got the luxury of re-encoding your music, that should be your first port of call. 128Kbit/s MP3s used to be the standard for digital music, but you can get similar quality with files that are roughly half the size. This is because AAC is a newer standard of music encoding that belongs in the MPEG-4 family (MP3 belongs to MPEG-3), with better compression at lower bit-rates.

To change the bit-rate in iTunes, go to 'Preferences > General' and click the 'Import Settings' button. Click the Setting drop-down menu and select Custom. If you want to fit the maximum number of songs on your iPod and don't mind taking a cut in sound, uncheck the 'Use Variable Bit Rate Encoding' option and select 64Kbit/s in the Stereo Bit Rate list. If you want sound quality similar to that of a 128Kbit/s MP3, keep the VBR option checked and select the 96Kbit/s option. To give you an example of the file size difference, a 3-minute track encoded to 128Kbit/s MP3 is roughly 2.8MB. The same song at 96Kbit/s VBR AAC is 2.2MB and the 64Kbit/s AAC 1.5MB. On the lowest-capacity iPod, encoding at 128Kbit/s MP3 will fit 1,462 3-minute songs; changing to 96Kbit/s VBR AAC gets you an extra 400 songs, and at 64Kbit/s AAC you get almost double what you could fit with 128Kbit/s MP3.

Worth noting, though, is that AAC isn't a universally recognised format like MP3. Most mobile phones, MP3 players and other digital devices will play it, but not all. This is something to keep in mind for future-proofing your music collection, especially if you get rid of your CDs. Another way to maximise the file space on your iPod is by using all of the intelligent features in iTunes like Autofill and smart playlists. Autofill works like a lucky dip into your music library — every time you use the Autofill function, iTunes will fill out your iPod with a random selection of tunes (although you can specify particular playlists for it to use). It's a quick way of making sure you've always got fresh new music on your iPod, and works especially well for smaller-capacity iPods that can't fit as many tracks at a time. The Autofill options are at the bottom of the iTunes screen.

You can get more granular control over what tracks end up on your iPod every time you sync by using smart playlists. If you only want songs on your iPod that you haven't heard in the last week or month, you can set up a smart playlist. Go to 'File > New Smart Playlist in iTunes', select 'Last Played', 'is not in the last' and then specify the time period in the variables. You can also limit it to a certain number of items, and specify the order that tracks are chosen, such as by random, by rating, when it was added and how often it's played. Conversely, if you only want to hear songs that you've been playing on heavy rotation over a certain period of time (like your favourite songs for the week), just change the second variable to 'is in the last'. apc


Check your importing settings to get the most out of your iPod.
Encoding rates aren't always equal — newer codecs offer more for less.
iTunes
Import Settings
AAC Encoder
Stereo Bit Rate: 256 kbps
Sample Rate: 44.100 kHz
Channels: Auto
Use Variable Bit Rate Encoding (VBR)
Optimize for voice
Use Default Settings
OK
Cancel
Enable full keyboard navigation
Language: English (United States)

APC EXPERT

JENNETH ORANTIA

An expert on all things mobile, Jenneth Orantia has been writing reviews and tutorials on smartphones for the last seven years. Her current phone of choice is the iPhone 3G, but she's also well-versed in Windows Mobile, Symbian, Palm and BlackBerry.

OPEN SOURCE CHALLENGE

Making the most of sources

Take advantage of Ubuntu's repository system to add your own and increase your software base.

APC EXPERT

ASHTON MILLS

Ashton has been using Linux since Slackware came on floppies, and before that he was one of the three people in the world who used OS/2 (and loved it). Always ready to make the most of his PCs, he is constantly playing with Linux distributions and compiling the latest kernel. This is his idea of fun, and why we get him to write for *you*.

One of the more powerful features of Ubuntu is its package repository system which, at the time of writing, includes some 26,000 packages. But this is by no means all the software you can download for Ubuntu. And while the range is extensive, it's also not always representative of the latest versions of the programs you can find within the repositories. For core packages especially, each version of Ubuntu will settle on a particular version of a program and stick with it until the next milestone distro release. One example of this is with Ubuntu 8.10 that bundled Open Office 3.0 and, even though 3.1 came out soon after, you had to install 9.04 before the latest Open Office appeared.

Unless, that is, you take advantage of the repository system. The Ubuntu repositories aren't the only ones you can tell your Ubuntu installation to pull software from. By adding more repositories you can easily install applications not included in the Ubuntu repositories, and update software that is included to the latest versions.

This month we'll take a look at some of the more popular third-party repositories you can use to expand your available software library.

ADDING A NEW REPOSITORY

First, for the uninitiated — how do you add a new repository? Ubuntu makes it easy, as long as you have the correct address for the repository.

Clicking 'System > Administration > Software Sources > Third Party Software' brings up what is essentially a nice GUI version of your 'sources' file (bring up a Terminal and run 'cat /etc/apt/sources.txt' to see it naked).

The format is quite simple: deb [repository URL] [ubuntu version] [category] where category can be 'main', 'universe', 'restricted' and so on as you can see under the Ubuntu Software tab in the Software Sources dialog.

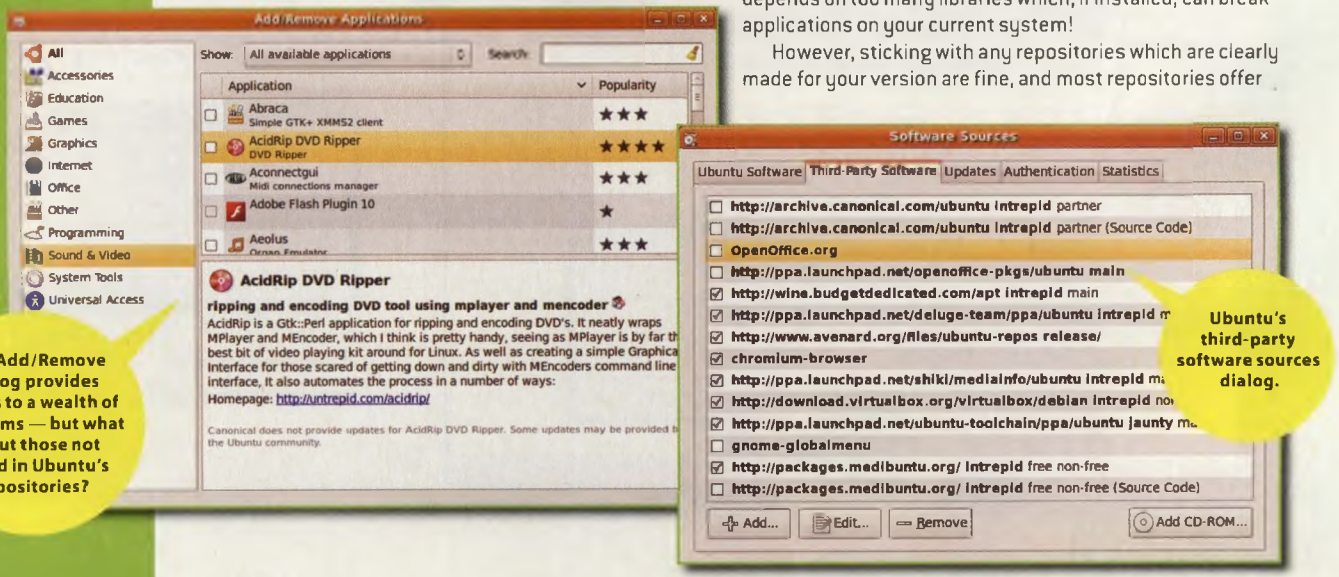
To add a new repository simply click 'Add' and paste in the full sources line from a repository that you want to use. Once a new repository is added refresh your local cache and then use the 'Applications > Add/Remove' dialog or Synaptic to find the new or updated versions of applications.

FINDING REPOSITORIES

Mostly, if you visit the homepages of the applications you like to use you will find documentation on adding the repository for that particular program, as long as they support Ubuntu. Examples of this include VirtualBox, Deluge, and VLC.

Some repositories don't represent a particular program, but a range of them, such as Medibuntu. Finally, Canonical keeps cutting-edge versions of software from Ubuntu's developers on repositories called PPA (Personal Package Archives) hosted at launchpad (see **https://launchpad.net/ubuntu/+ppas**). PPAs are often the only place to find software for the up-coming next release of Ubuntu which may, but not always, work on earlier versions — and here is one important word of caution: using software intended for the next release may break your current release if it depends on too many libraries which, if installed, can break applications on your current system!

However, sticking with any repositories which are clearly made for your version are fine, and most repositories offer



packages of their software for multiple versions of Ubuntu at the same time.

Following is a compilation of some of the more popular repositories and applications. Where possible the project page is listed that includes repository source lines for multiple Ubuntu versions — visit them to get the correct source line to paste — but if this isn't available a direct line for Jaunty is listed below.

DELUGE

https://launchpad.net/~deluge-team/+archive/ppa

Deluge is an excellent Bittorent client that is generally considered the better alternative to Transmission that ships with Ubuntu by default. The repository is hosted at launchpad, use the drop-down box to select your version of Ubuntu and copy the sources line. A signing key is also provided.

VLC

https://launchpad.net/~c-korn/+archive/vlc

The universal play-anything and cross platform player can also be found at launchpad. Like Deluge, VLC isn't part of a standard Ubuntu installation but is a superior replacement for Totem.

MEDIBUNTU

https://help.ubuntu.com/community/Medibuntu

Medibuntu has been covered here before and provides some essential packages, such as those required to play back encrypted DVDs. Medibuntu provides its own repository and key, and the easiest way to add it is to follow the instructions from the above URL.

FIREFOX

https://launchpad.net/~ubuntu-mozilla-daily/+archive/ppa

While Ubuntu does occasionally feed Firefox updates down the line, you can grab the latest binaries here.

OPERA

deb http://deb.opera.com/opera/ lenny non-free

Firefox not your browser of choice? Opera, too, can be had and updated on your system with each new release. Opera maintains its own repository, there's no homepage for it however, the above is the direct source link to use (lenny comes from Debian, upon which Ubuntu is based. Many packages for Debian also work for Ubuntu).

CHROMIUM

https://launchpad.net/~chromium-daily/+archive/ppa

Or eager to stay up to date with Google's latest? Chromium is getting better by the day — literally, as the repository at launchpad includes daily builds of the browser for Ubuntu.

WINE

deb http://wine.budgetdedicated.com/apt jaunty main

Ubuntu provides Wine in its software library to help run Windows programs on Ubuntu, but again for the latest version grab it direct from the above repository.

UBUNTU TWEAK

deb http://ppa.launchpad.net/tualatrix/ppa/ubuntu jaunty main

Ubuntu Tweak is a great little application to tweak Ubuntu's configuration, including providing a range of software repositories beyond those listed here.

VIRTUALBOX

www.virtualbox.org/wiki/Linux_Downloads

Updates are regularly released for VirtualBox, so if you do a lot of virtualisation it's worth staying up to date. The VirtualBox download page includes binaries, source lines for Debian and Ubuntu, and instructions for adding the signed key.

OPENOFFICE

https://launchpad.net/~openoffice-pkgs/+archive/ppa

Development versions aside, you can often grab the latest stable OpenOffice as binaries from the OpenOffice homepage or automatically via the above PPA link.

Don't forget you can search for repositories for your favourite applications via their homepages, if the service is offered, or on the launchpad PPAs. apc

HOW TO... SIGN REPOSITORIES

There is one more step, but it's optional. Until a repository is 'signed' Ubuntu has no way of knowing if the software downloaded is legitimate. When you refresh your sources, you will get an error to this effect for any unsigned repositories. This doesn't actually effect your ability to download software from them, it's simply a warning. It can be annoying however, so sign and verify the sources to prevent this. Unfortunately, Ubuntu doesn't provide any means to automate this.

You need the 'signing key' from a repository (most have them) and then add it to your system. The Authentication tab allows you to add a key if you have the keyfile, but most repositories will provide the key value itself. These need to be installed in combination with the repository from a Terminal, like so:

```
sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys [singing key]
```

The above is for Ubuntu's PPA archive.

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WEB DESIGN

Publish a web site with movable type

Karl Hodge transforms a blogging platform into a content management system.

WHAT YOU'LL NEED

MOVABLE TYPE
The PHP/CGI application forms the basis for our tutorial. Grab the latest version from *www.movabletype.org*.

FILEZILLA
Although it's a rather outdated protocol, FTP is still the easiest way to transfer and update files on your webspace. FileZilla is available from *www.filezilla-project.org*.

WINDOWS NOTEPAD (OR ANY TEXT EDITOR)
We're going to be editing the web code directly, so you'll need a text editor on standby.

WEB HOSTING
You'll need some space and a server supporting PHP, CGI and MySQL.

Movable Type 4 is a powerful hybrid PHP and CGI application best known for its blog publishing power. However, its page publishing features and static URLs also make it a great choice as a content management system. To install the software, you'll need to download the open-source version from **www.movabletype.org** and then follow the instructions for installation at **www.bit.ly/105Sii**. You'll need to create a new MySQL database in your webspace before you begin — taking note of the log-in details — so make sure your account has MySQL, PHP and CGI support before you proceed. When that's done, you're ready to hack Movable Type into a CMS.

ACCESS IT WITH FILEZILLA

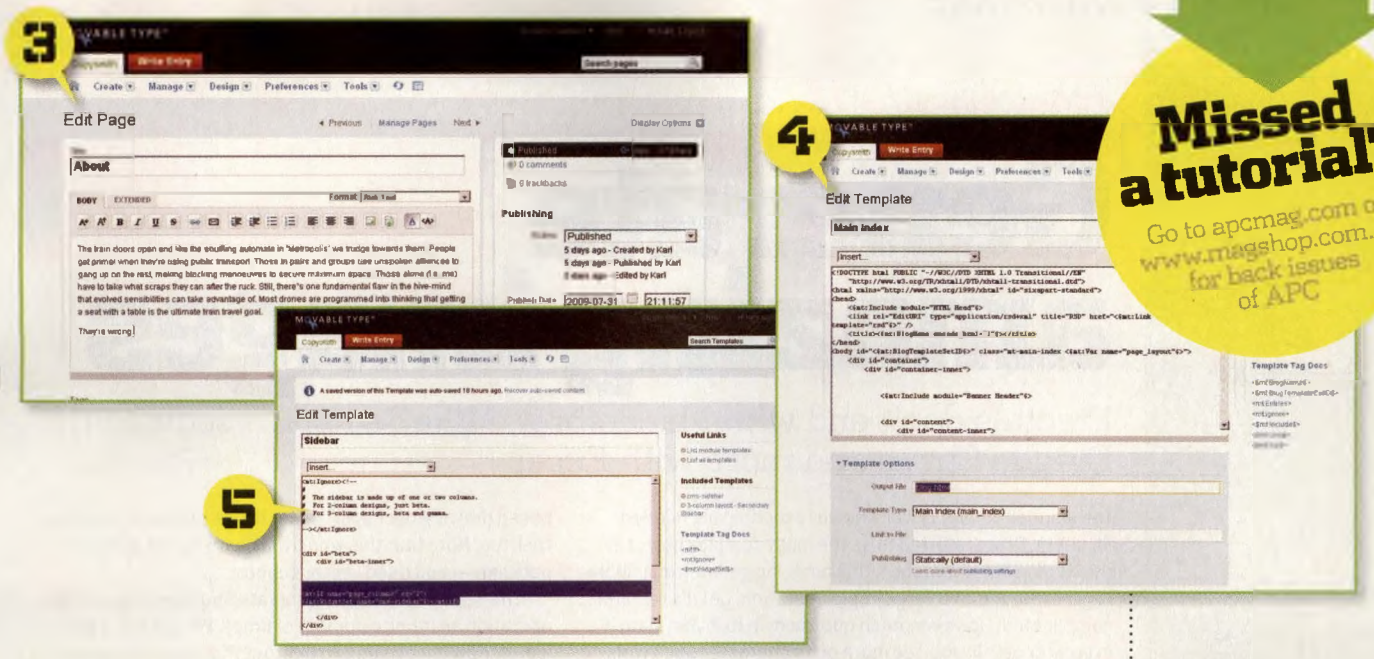
The first thing to do is use open-source app FileZilla to FTP into your Movable Type installation. Why FileZilla? Because it enables you to set up a default editor. In this case we chose Notepad because we only need to make a couple of quick tweaks. Go to 'mt-static/themes/' and choose any of the folders in this directory. We used 'unity-blue'. Download a copy to your local machine and rename the folder cms-style. Open the local folder and right-click on 'screen. css'. Choose 'Edit', change the name of the layout to CMS Style and alter the other details in the block at the top. Once you've done all that, you can save the file.

APPLY THE STYLE

1 Close the text editor and log in to your Movable Type dashboard. Go to 'Design > Styles'. You'll now have a new style available called 'CMS Style,' which you should choose. For the layout, pick '2-Columns, Wide, Thin' and then click 'Apply Design'. If you like looking at empty blogs, you can now preview the changes you've made so far.

EDIT THE CSS

2 Movable Type styles control the overall look of your blog pages. They're CSS-based, so it's easy to tweak colour schemes and formatting. The handful of layouts offers a fair amount of flexibility. For example, the two default two-column layouts enable you to swap the sidebar from right to left. These layouts are also controlled by CSS in a global file named 'blog.css', which is part of Movable Type's modular template system. While most dynamic sites separate form and content, MT goes a step further, separating form, content and structure. To alter your page structure you'll need to directly edit the underlying templates as shown in the next steps.



Missed a tutorial?

Go to apcmag.com or www.magshop.com.au for back issues of APC

EDIT THE TEMPLATES

Go to the Design menu and choose 'Templates'. You'll see a list that govern the structure and content of your blog pages and its archives. The global style sheet 'styles.css' is labelled 'Stylesheet'. You can add CSS to this document after the '@import' lines. For example, to define the font type invoked with the <H1> tag you might add H1 {font-type: sans-serif;}.

To apply the change to your blog, click on 'Save & Publish'. Remember, Movable Type uploads your blog as static HTML, so any changes that you make must be published to your webspace. When you've finished, return to 'Design > Templates'.

EDIT FROM THE SOURCE

You can also go direct to the source in order to edit the templates. You'll notice that one of those '@import' commands points to the file called blog.css in '/mt-static/themes-base/'. This file controls the layout for all of the templates in Movable Type, and it doesn't have to be fixed. Copy blog.css and move it to the cms-style theme directory. Next, change the '@import' URL to /mt-static/themes/cms-style/blog.css. Now you can edit the file without breaking any of the themes.

To try this out, open the file in a text editor and scroll down until you reach the comment '/* Wide Thin */'. You'll be able to see that each column is given a fixed width that adds up to 940 pixels. Keeping this in mind, you can happily tweak the widths of the alpha and beta columns as long as they add up to 940 pixels in total without creating any problems with the template.

DELETE THE BLOGS

3 We promised we'd turn Movable Type into a CMS rather than a blogging tool. The first step is to remove all traces of blog. Go to 'Manage > Entries' in the dashboard and delete the default entry that Movable Type makes when you start using the program. You won't be creating blog entries in future, you'll just be using MT's 'Page' function. So, the next step is to go to 'Create > Page' to make your first page. Call it 'About this Site' and add some text. This will be your site's front page, so we'll need to make it the page MT opens by default. Before saving the page, name it index.html using the Filename textbox on the right.

POINT TO THE RIGHT PAGE

4 Try viewing your site now and you'll be disappointed. Instead of the page that you just created, all you'll see is an empty blog list. That's because, by default, Movable Type's front page is a list of current blog entries, which is also given the filename 'index.html'. We need to fix that. Go back to 'Design > Templates' in the dashboard and click on 'Main Index'. Click 'Template Options' next and change the output file from index.html to 'blog.html'. Click 'Save & Publish'. Return to your blog's front page, and you should now see the 'About this Site' page instead.

FIX THE WIDGETS

One last hack is required to get this site looking less like a blog. Go to 'Design > Widgets'. Movable Type uses these widgets to help you change your layout. We're going to change the navigation sidebar in the site. Click 'Create Widget Set'. You'll see two columns, one empty and one full of widget names. Using the magic power of AJAX, you can drag and drop widgets from the right column to the left, where they'll be added to your bespoke module. We used 'Page Listing', 'Search', 'About this Page' and 'Creative Commons'. Save your changes when you're done.

EDIT THE SIDEBAR

5 Finally, return to 'Design > Template' in the dashboard and click the file labelled 'Sidebar'. Delete the lines after '<mt:If name ="page columns" eq="2">' all the way up to the first closing . In its place, insert the line <$mt:WidgetSet name="cms-sidebar" $></mt:if>.

Save your changes and then click the 'Publish Site' icon to propagate the changes throughout. This adds your new navigation widget to every page that you create for your web site from now on. If you'd rather not have to complete quite such a drastic hack just in order to make a new navigation widget, you could make an alternative Sidebar file by copying the original and changing the reference to the file in the main index page. apc

DO THIS... TEMPLATE HAMMER

If you've used earlier versions of Movable Type, you might feel confused by this version's template system. Previous iterations used a single flat template, much like Blogger, that enabled you to build page layouts in your favourite web authoring tool. The new modular system has a few advantages over its older counterpart, and it enables you to create reusable code that can be plugged in to all your blogs. If you'd rather create your layout the old-fashioned way, use Template Hammer, a plug-in that converts your templates to a flat HTML file. Find it at *http://plugins.movabletype.org/template-hammer*.

FRACTALS

Generate amazing images

Fractals don't end with Mandelbrot; **Mike Bedford** discovers the Dragon Curve and more with Excel.

WHAT YOU'LL NEED

MICROSOFT EXCEL
We're using Excel because it makes it much easier to appreciate the underlying maths than by using dedicated fractal software. OpenOffice.org Calc will also work to an extent.

A VECTOR DRAWING PACKAGE
Adobe Illustrator, Corel Draw or OpenOffice.org Draw should do the trick perfectly well.

DRAGON.XLS, IFS-DRAGON.XLS AND IFS-FERN.XLS
You'll find these spreadsheet workbooks on the *APC* web site at *http://acpmag.com/workshops.htm*.

The Mandelbrot Set is well known to technically minded PC users. Often referred to as the most complex object in the whole of mathematics, this amazing geometrical figure is generated from a very simple operation, yet it's infinitely complicated. However much you zoom in to investigate it in greater detail, you see more of its characteristic swirls and starbursts.

The Mandelbrot Set is a fractal figure, which means that it exhibits self-similarity at all levels of magnification. However, the Mandelbrot Set and its close relatives, which are generated by using so-called 'escape time' algorithms, aren't the only type of fractals. Here we delve into fractal geometry in the broadest sense to help you get a better feel for this fascinating field of mathematics. Although there's no shortage of fractal software available, in the main we'll work with ordinary drawing software and Excel, since this will provide you with a much better feel for exactly how fractals are created.

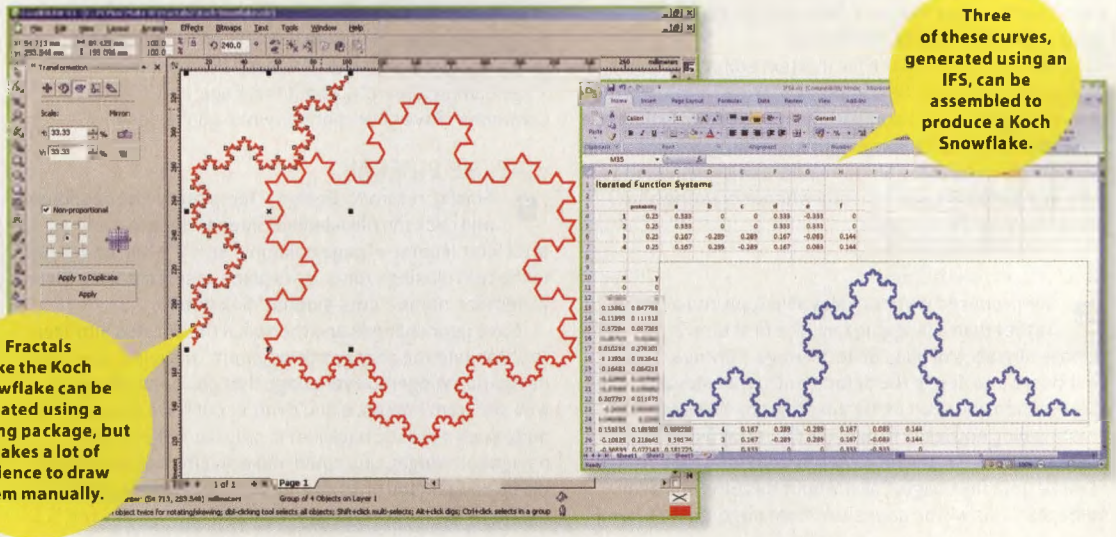
THE KOCH SNOWFLAKE

The Mandelbrot Set is a fractal that comes about by carrying out a simple mathematical operation. However, the first fractals to be discovered were quite different. We'll start by generating the very first fractal figure, which resembles a snowflake and was devised by the mathematician Helge von Koch in 1904. We've used Corel Draw here, but you'll be able to do the same with any vector-based drawing package — OpenOffice.org Draw will do the trick too. Note that this won't work with a pixel paint package — you need vector support.

The Koch Snowflake is generated by repeating a simple operation an infinite number of times. We can get a good idea of how it looks by carrying out that operation just a handful of times. Start by drawing an equilateral triangle (that's one in which all the sides are the same length). This will be the base of our fractal.

Now replace each of the sides of the triangle with a line of the same overall length but which has an 'equilateral bump' in its middle third. That means that the central third of the line should be replaced by a smaller equilateral triangle shape protruding outwards. Now, do exactly the same thing again, replacing each line segment (of which there will now be 12) with a smaller version of the line with a bump. Do this once more and, if you're really patient, you'll start to get a feel for this fractal. The process might be a bit difficult to visualise from these instructions, but the screenshot below should make the process clearer. All of this is pretty easy if you're au fait with your drawing package: once you've drawn the triangle and line with a bump, everything else can be completed by simply copying, scaling, rotating and dragging objects into place.

When Koch first publicised his snowflake, mathematicians called it a monster because it had some unusual properties. For example, its perimeter


Three of these curves, generated using an IFS, can be assembled to produce a Koch Snowflake.
Fractals like the Koch Snowflake can be created using a drawing package, but it takes a lot of patience to draw them manually.

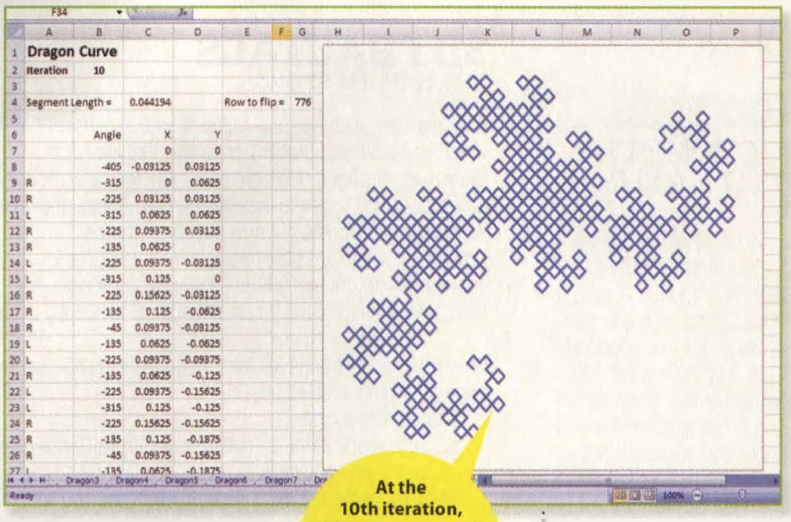
CURVE VALUES

THE VALUES FOR THE DRAGON CURVE'S ITERATED FUNCTION SYSTEM.

Probability	A	B	C	D	E	F
0.5	0.5	-0.5	0.5	0.5	1	0
0.5	0.5	-0.5	0.5	0.5	-1	0

THE MORE-COMPLICATED IFS VALUES FOR THE KOCH CURVE.

Probability	A	B	C	D	E	F
0.25	0.333	0	0	0.333	-0.333	0
0.25	0.333	0	0	0.333	0.333	0
0.25	0.167	-0.289	0.289	0.167	-0.083	0.144
0.25	0.167	0.289	-0.289	0.167	0.083	0.144



At the 10th iteration, this Dragon Curve is already starting to show self similarity at all levels of magnification.

Iterated System Functions can be used to generate lots of fractals,including the Dragon Curve.

is infinitely long yet it encloses a finite area. Another strange property is that it has approximately 1.26 dimensions — previously, mathematicians had thought that a figure's dimensions had to be a whole number of 1, 2 or 3 in the real world. This fractal prompted some rather crucial questions.

THE DRAGON CURVE

A similar fractal called the Dragon Curve can be generated in exactly the same way, but using a line with a 90° bend at its centre as the base and exactly the same shape each time a line segment is replaced. However, we're going to generate it differently.

Take a piece of A4 paper and fold it in two with the fold at the centre and parallel to the shortest side. Now fold it in two again, with the second fold parallel to the first and in the same direction (left-to-right or right-to-left). Do this twice more, which is about the limit of what's possible. Finally open the sheet back out while trying to make sure that each bend is a right angle. If you look at the paper end-on you'll see a Dragon curve — or at least an approximation to one; for the real thing you'd have to fold the paper an infinite number of times.

Admittedly, this last exercise has nothing to do with computing. It's also very difficult to do, so don't worry if your paper folding produced nothing very impressive.

However, it does set the scene for generating a Dragon Curve in our Excel workbook, which simulates this folding exercise. The first iteration of the Dragon curve — the line with a single right-angled bend in the middle — can be described as 'R' (for 'right turn'). To create each subsequent iteration, take the definition of the previous iteration, add an R to the end and then repeat the previous iteration but with the middle letter flipped (from an L to an R, or vice versa). So, for example, the second, third and fourth iterations will be 'RRL', 'RRLRRLL' and 'RRLRRLLRRRLLRLL'.

To see the first few iterations of the Dragon Curve, open the workbook 'Dragon.xls', which you'll find at **http://acpmag.com/workshops.htm**. The worksheets 'Dragon1' to 'Dragon10' show the definition of iterations one to 10 using the notation shown above, and they're also plotted graphically. If you look at the equations in the various cells, you'll see that all the fractal really involves is a bit of simple trigonometry. And if you're confused by the formulae such as 'SIN(B8/180*PI())', it might help to know that the 'B8/180*PI()' bit is just to convert the angle in B8 to radians as used by Excel's SIN function, while allowing all the angles shown in the workbooks to be presented in degrees.

We're now going to create the 11th iteration, but you could go as far as you want, depending on your patience. Because we're only going to go to a handful of iterations, after which changes appear visually ever smaller, the process is largely manual.

To generate the 11th iteration, insert a new worksheet and rename it 'Dragon11'. Now copy everything from workbook Dragon10 to Dragon 11, and change the iteration number in B2 from 10 to 11. Now, scroll down to the last row used — which is 1,031 — and add an R in the next row, which is cell A1,032. Next, copy the column of Ls and Rs up

MORE ABOUT... FREE FRACTALS

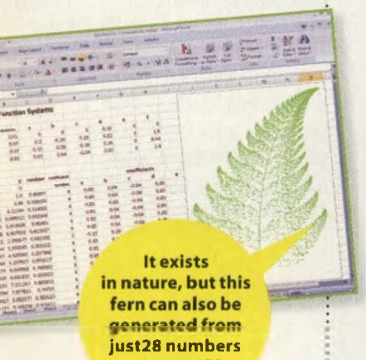
Our aim here is to introduce you to fractals other than the Mandelbrot Set, as exploring these lesser-known shapes can be fascinating. Although many of the fractal packages have a price tag attached to them, Fractint is a free and highly recommended way to get to grips with the Mandelbrot Set and its relatives.

MATHS METHOD

Most fractals can be generated either by using an IFS or by using an escape time algorithm (which is the method used to create Mandelbrot-type fractals). However, those fractals that can be generated using an IFS can often be generated using other methods, just as we saw for the Dragon Curve. Another example is the Sierpinski Gasket, which can be generated from an IFS or using cellular automata — which, intriguingly, is a quite different sphere of mathematics.

DO THIS... GEOMETRY TO NATURE

So far, all of our fractals could be described as geometric figures. What is more surprising is that the same equations can produce results that look far from mathematically generated. To see what we mean, open the workbook 'IFS-Fern.xls' from **http://acpmag.com/workshops.htm**. Unlike our previous IFS fractals, though, it has vastly different probabilities. Since the first set of constants has a probability of just 0.01 and the last 0.85, the first will, on average, turn up only once for every 85 times the fourth set turns up. That makes all the difference, though, as you'll discover if you try changing that 0.01 to 0. The end result looks biological rather than geometrical. In fact, it's an almost perfect replica of a real-world fern. The reason that it can be generated using an IFS is that it's a fractal: each frond is a smaller scale replica of the frond it branches out from. Of course, this process eventually comes to an end with a real fern, but the IFS version goes on forever (as long as you plot enough points and view the end result at a sufficiently high magnification).



It exists in nature, but this fern can also be ~~generated from~~ just28 numbers using an IFS.

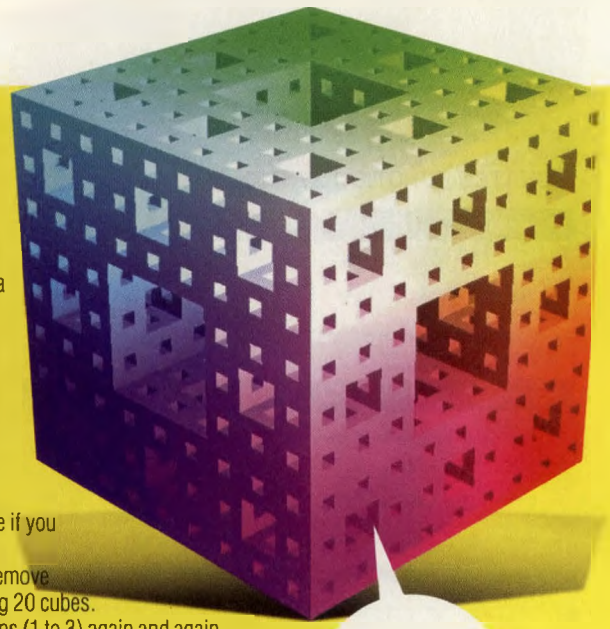
3D FRACTALS
THE MENGER SPONGE

Although fractals have a so-called 'fractal dimension' which isn't a whole number (remember that the Koch Snowflake is roughly 1.26-dimensional), they are all two-dimensional in the sense that they can be represented on a flat screen and printed out on a flat piece of paper. However, it's also possible to create fractals in three dimensions (or, for that matter, higher dimensions if you can get your head round that mathematical concept).

One of the most famous 3D fractals is called the Menger Sponge, and it's created like this:

1. Start with a cube.
2. Sub-divide it into 27 cubes, of which you'll see nine if you look at any one face.
3. Remove the middle cube from each face and also remove the cube at the centre of the whole structure, leaving 20 cubes.

Now, for each of those 20 cubes carry out the operations (1 to 3) again and again. To see what the end result looks like, take a look at the computer-generated image. This is actually the fourth generation of this amazing figure (if you count the initial whole cube as the first) and it contains 8,000 cubes. The next two generations contain 160,000 and 3,200,000 cubes, so the time that's needed to make each generation escalates rapidly.



The Menger Sponge is a classic example of a fractal in three-dimensional space.

to but not including the R you've just added (A9:A1,031) to the next free row (from A1,033 down). To complete the definition of the 11th iteration, you need to flip the middle letter in the sequence you've just copied. You'll be shown in cell G4 which row this is. Since it will show 1,544, you need to flip the letter in A1,544. You'll find it's an R, so change it to an L. Next, calculate the coordinates of the second half of the new fractal copy cells B1,031:D1,031 down to row 2055. Finally, because the graph that was copied from Dragon10 will still show the 11th iteration, change the data range plotted from Dragon10!$C$6:$D$1031 to Dragon11!$C$6:$D$2055 to see the 11th iteration in all its intricate glory.

USING ITERATED FUNCTION SYSTEMS

Fractals are fascinating in that they can often be generated by processes that are apparently very different. We've already seen that the Dragon Curve can be created by folding paper as well as by manipulating strings of Ls and Rs in Excel. It could also be drawn by hand using the same method that we used for the Koch Snowflake. In common with many fractals, though, it can also be generated using an Iterated Function System (IFS). Let's see how that works.

Start off with a random point, defined by its x and y coordinates, and mark it on a piece of paper. Now repeatedly carry out the following transformations to give new values of x and y, and plot the position of the new point.

$$x_{n+1} = ax_n + by_n + e$$
$$y_{n+1} = cx_n + dy_n + f$$

In these equations, x_n and y_n are the current values of x and y, x_{n+1} and y_{n+1} are their values following the transformation, and a, b, c, d, e and f are constants.

There's more than one set of the constants a, b, c, d, e and f, and each set is chosen at random according to their associated probability within the system. Of course, you can't do this without knowing the values of these constants, and these define the particular fractal that you're creating. Those given in 'Curve Values' (previous page) are the values used to create the Dragon Curve.

The fact that both probabilities are the same indicates that each set is equally likely to be used when choosing one at random. However, this isn't always the case: had there been three sets of constants with probabilities 0.25, 0.25 and 0.5, the first two sets would be equally likely to be chosen, while the third set would be twice as likely to be picked.

To see this in action, open the Excel workbook 'IFS-Dragon.xls' from **http://acpmag.com/workshops.htm**. If you delve into it you should find it's easy to understand and that it does indeed implement the IFS transformation described above. Note that the first 10 points have not been plotted. This is because the first point (0,0) might not be on the curve, in which case it will take several iterations before it converges on it. The result doesn't look quite like our earlier Dragon Curve because it's built up as dots rather than lines, but the more points you add, the closer you'll get. To see the shape more clearly, you could try increasing the number of points, to, say, 32,000.

If you Google for 'IFS Fractals' you'll find lots of other sets of IFS constants for generating other fractals. For now, try using the set that we've listed in 'Curve Values'. You'll have to add one more line of constants to the workbook, but it will happily cope with up to four, which is enough to define most fractals.

You might not immediately recognise the end result, but if you take three of these curves and superimpose each on the sides of an equilateral triangle, you'll probably recognise the Koch Snowflake shape. Suitably enough, this fractal is actually called the Koch Curve. BDC

GAMING

Make your own platform games

Learn to use Gamemaker and you'll be able to create top-flight indie games. **Jon Thompson** shows you how.

WHAT YOU'LL NEED

GAMEMAKER
The free version of the program will do for this tutorial. Find it at *www.yoyogames.com/gamemaker*.

GIMP
The GNU open-source program is an invaluable aid when putting together graphics and tiles. Grab it from *www.gimp.org*.

Retro's back in a big way, and with the recession deepening, no-one has any money for games. So what better time to create your own classic platform fun? But rather than peeking and poking individual bytes as developers had to in the '80s, there is some great free software out there that will take the sting out of creating and sharing your own games. In this multi-part guide, we show you how to create your own platform game using the free version of the excellent Gamemaker application.

1 CREATE SPRITES

After you've installed Gamemaker, the first step in creating a platform game is creating sprites. These are the images that represent objects on-screen. They can be any shape you like, and we've included all the ones used in our demonstration game — rudimentary as they are — on our web site at **http://acpmag.com/dvdware.htm**.

You can use any graphics app you like to create sprites, and there's only one important thing to remember: sprites can have a quality known as 'transparency'. This doesn't mean you need to use a graphical format that supports transparency; it simply means that when Gamemaker encounters a pixel of a certain colour in the sprite, it will show whatever is behind it instead of overwriting what's already on the screen. Gamemaker just needs to know which colour to interpret as being transparent. To do so, it takes the colour of the top-left pixel as being the one to declare as the sprite's transparency colour.

Later, we'll define a room for our game with the dimensions 1,024 x 768 pixels. If we define platform blocks consisting of 32 x 32 pixels, we can create quite a complex layout using 32 x 24 blocks arranged in a grid for the player's character to run across and jump between. So, open your graphics program, create a shape of 32 x 32 pixels, and save it.

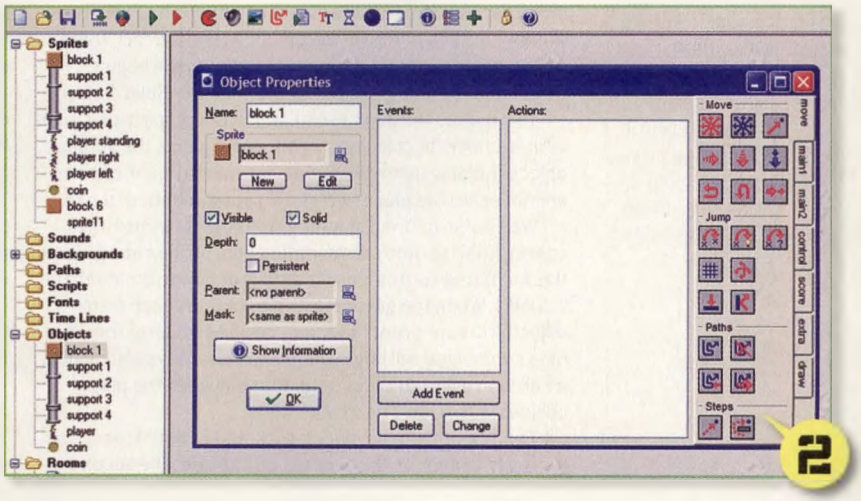
In Gamemaker, click on the menu bar icon that looks like a red Pac-Man. This creates a sprite (which you can see in the Sprites tree in the left-hand pane) and opens its Properties window. You can open the Properties window of any game element by double-clicking on it in the left-hand pane of Gamemaker's main interface.

Enter a name for the sprite, then click on the 'Load Sprite' button and navigate to the image you just created. For the moment, you don't need to worry about the other settings. Notice the checkbox marked 'Transparency', however. This is how you tell Gamemaker to interpret the colour of the top-left pixel of the image as being the transparency colour.

As well as creating the image for the platform, we've also created several other graphics to serve as decorative supports. These are also 32 x 32 pixels in size, but because they are thinner than 32 pixels in places, we used black as the transparency colour.

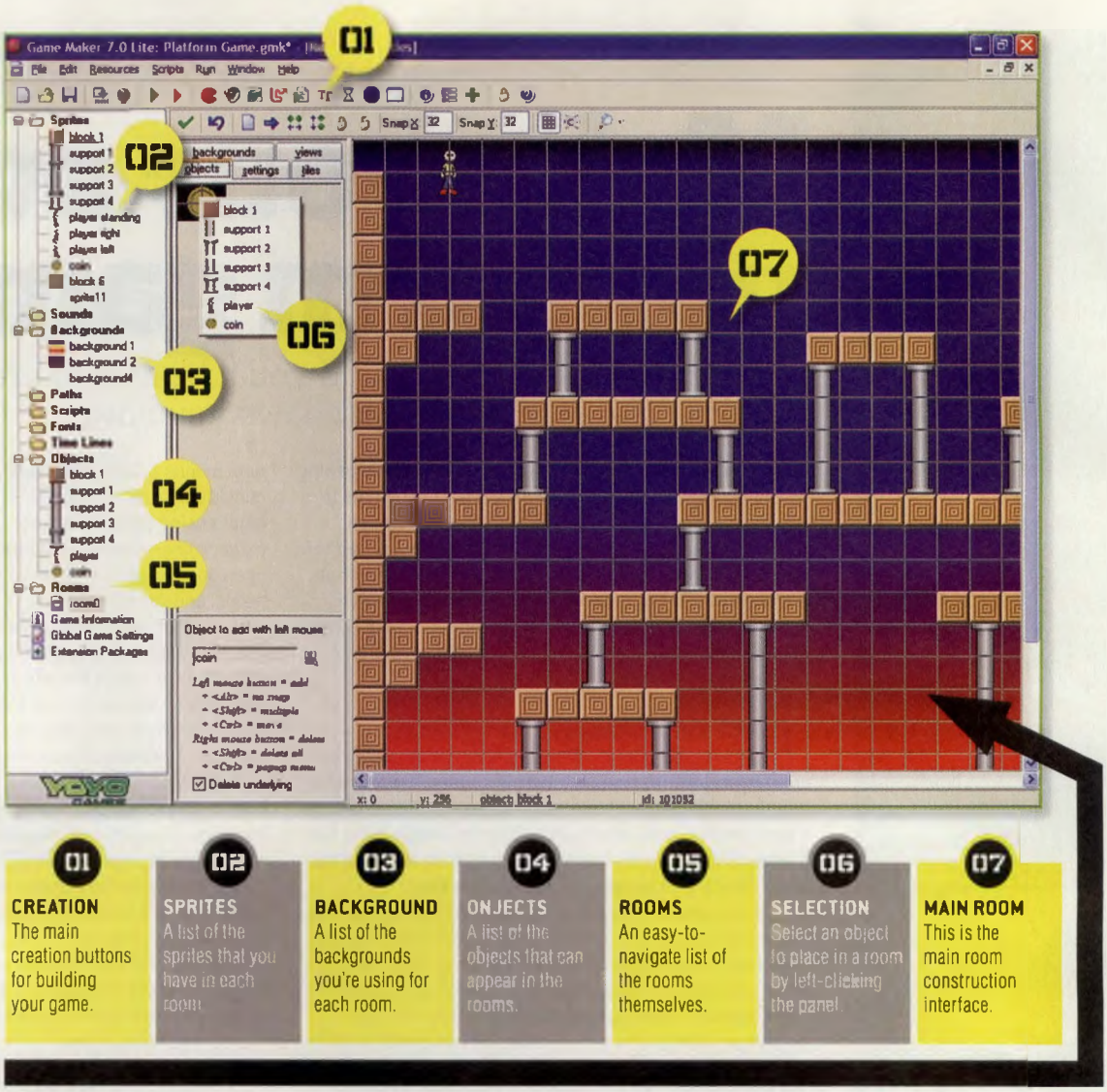
2 CREATE SOME OBJECTS

The next step is to assign the sprite images you create to objects that will appear within the game. Some objects have logic — called events — assigned to them that control their behaviour. For example, the player's object will



MORE ABOUT... ANIMATED SPRITES

You can buy dedicated software to animate GIFs, but did you know that creating animated sprites from single images requires nothing more than GIMP? Place all the images you want to animate in the same directory and number them in frame order. From the File menu in GIMP, select 'Open as layers' and select the images in order to import them. Go to 'Filters > Animation > Playback...' to find a window that allows you to see how the finished GIF will look. You can also select and edit the individual layers by going to 'Windows > Dockable Dialogs > Layers'. On the same menu, select 'Optimise for GIF'. This creates an animated GIF from the layers and crops it to remove extraneous space. In this window, select 'File > Save as', navigate to the directory containing your game and enter a filename with the extension '.gif'. The extension tells GIMP to open an export Options window. Make sure that the 'Save as animation' radio button is selected, then press 'export'. Enter a comment in the resulting box and press 'Save'. Your animated sprite is now ready to import into Gamemaker.



need to respond to keypresses and collisions with other objects. We also need to know what to do when he falls into free space.

To create an object, click the blue ball icon on the menu bar. This creates the object and opens its Properties window. Enter a name for the object. At the top-left, there's a drop-down menu for assigning a sprite to the object. Select a sprite using this menu and click the 'Solid' button.

This makes the object solid, which is a property we'll use later to check for collisions. In our demo game, the support objects holding up the platforms are merely cosmetic and are not solid. The player will simply pass in front of these.

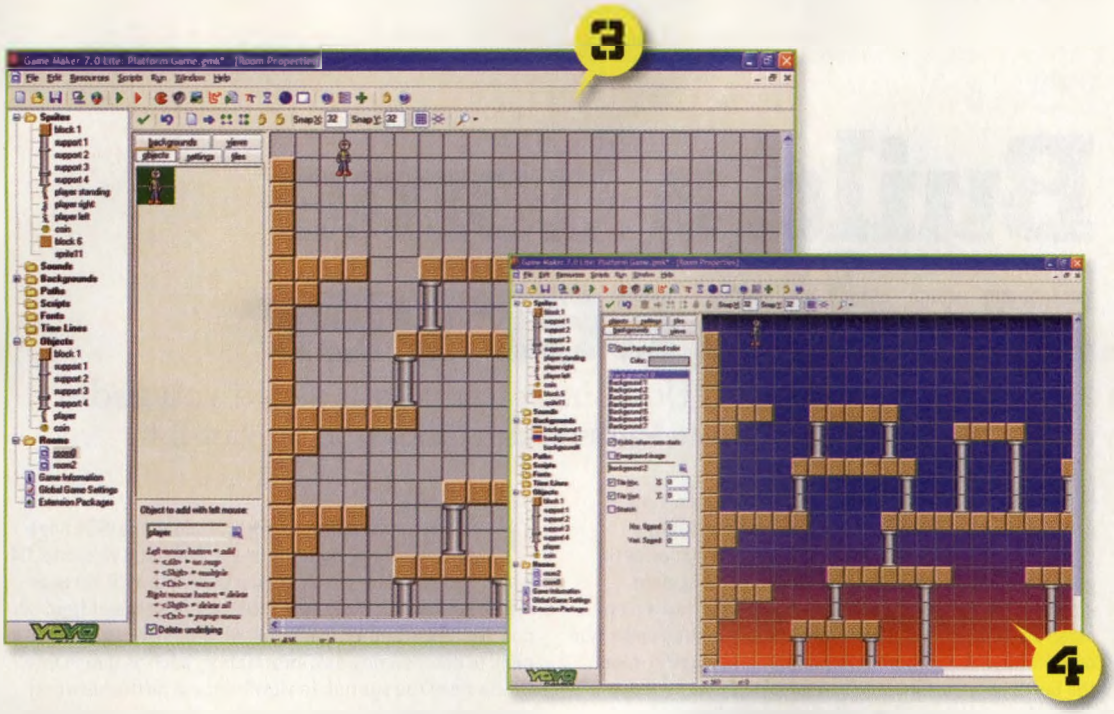
We've also defined spinning coin objects as points to collect. Their sprites use animated GIFs as their image (see the 'Animated sprites' box for details of how to create these in GIMP). When the game starts and creates each coin object, a Create event randomly decides which of the GIF's nine subimages will begin the animation. We've also added a Collision event that destroys the coin when the player collides with it, as if he's collected it.

To add events to an object, click 'Add Event'. A menu will pop up that defines the events you can add. The second event in the coin object's list checks for collisions with the player. Click on this to display the actions it takes when the event happens. This says that the instance of the coin object should be destroyed, and that the score should increase by one. It then checks that all the coins (we've used 11) have been collected and, if so, simply exits the game.

This is one of a wide range of actions you can see by clicking on the tabs along the right-hand side of the Properties window. These are split into several sections. To add an action to an event, simply drag it into place.

The most complex object in the game is the player. Open his properties and take a look at the events. There are those to handle when the player is created (we put him in a standing position) and also what to do with each step of the game (we set the gravity to pull him down if there's nothing to collide with below him and ensure that he doesn't fall too fast as he accelerates).

We also test for a collision with a platform block in whatever direction he's travelling. The system variable 'direction' gives the current direction. If he's in collision with something, we stop him.



Events to test for presses of the left, right and up cursor keys are also required. The actions behind these change the character's sprite to something appropriate, test to see if it's possible to move in the specified direction, and if so, set the object's speed. Finally, there's a similar pair of events that test for the left and right keys being released. These stop the character and change his sprite to one where he's standing still.

3 CREATE A ROOM

To create a room, click the menu bar icon that looks like a small program window. This creates a new room and displays its Properties window. There are several tabs to this window. Choose the Settings tab and enter the dimensions '1,024' for the width and '768' for the depth. Next, click on the Objects tab. In the pane below it, you'll see the currently selected object type. Clicking on this gives a drop-down menu of objects. Select the block used for the platforms and click on a square in the right-hand pane. This deploys an instance of the object. Right-clicking on the object type will remove it again.

Create several platforms like this, then switch to the player object and create one instance somewhere. Now save your game and press F5. This will compile and run the game so that you can see how it looks so far. Move the player around to see how he moves. To exit the game, press Esc. You may like to tweak the values in the player object's logic to fine-tune the strength of gravity, the speed at which he runs and so on.

If the animated GIF for any of your sprites runs too quickly in the game, you can slow it down. Whenever you add an action to change the sprite's image, if it's animated, you can enter a speed as well as the exact subimage at which to begin the animation. A speed of 0.5 will play the GIF at half the usual speed, 0.25 will play it at a quarter and so on.

Part of the art of writing good platform games is to get the player to visit every part of the room without having to travel needlessly back and forth. It can take quite a long time to make sure that each room is playable and interesting, but the results are well worth it.

4 CREATE A BACKGROUND

There are still no baddies to outmanoeuvre, and that grey background is very dull. Baddies we'll explore in the second part of this guide next issue, but we can do something about the background with minimal effort. We can also reduce the amount of the game displayed using a window and have the action follow the player around as he jumps and runs.

First, the backdrop. Create an image as big as the room (in this case 1,024 x 768 pixels) and save it. For a simple but effective method of creating backgrounds using GIMP, which blends colours as per many of the classics of platform gaming, see the 'Gradient backgrounds' box.

To add your background and see how it looks, click the menu bar icon that looks like a small painting. Give the background a name and press 'Load Background' to load your background image. Next, press 'OK' and open the room's properties. Then select the Backgrounds tab. Near the bottom of the options, there's a drop-down menu. Initially, this has the value '<no background>'. Click on this and select your background to make the background change.

Some games benefit from having the player only able to see the small amount of the room he's in as he moves around. This window on the room is called a 'view'. To enable this, click on the Views tab. Click the checkbox 'Enable the use of Views' and select 'View 0' in the list. Make sure the checkbox 'Visible when room starts' is ticked, and make sure that the Object Following drop-down menu is set to the player's object. You may need to experiment with the Hbor and Vbor settings to trigger scrolling when the player moves. We used a value of 256 for each as this gives the game a good feel.

Next issue, we're going define some baddies, create a scoreboard, add sounds and much more.

DO THIS... GRADIENT BACKGROUNDS

The background we used in our example game is a single image and was created in GIMP. First, we created a new image of 1,024 x 768 pixels. If you're going to use a single image for your background, it should be as big as the room.

Next, select the Blend tool in order to open its controls. Select the Gradient tab and a selection tool will open showing all known gradients. Choose one and the selection tool will disappear. Now, place the cursor at the top and middle of your image and, holding down the mouse button, drag it to the bottom. Let go and GIMP will fill the image with the gradient.

The Shape drop-down menu allows you to apply some more interesting effects to the gradient. For example, using the radial setting makes the gradient wrap itself into a ball, enabling you to quickly create a backdrop of a planet or nearby star.

Creating cool gradated backgrounds is easy with GIMP.

LINUX

Build a home media server

Don't ditch that old PC! Use Linux to make it serve you audio and video instead. **Simon Pickstock** walks you through it.

WHAT YOU'LL NEED

UBUNTU LINUX
This popular Linux OS installs in minutes, is easy to use and scales nicely to older systems.

MEDIATOMB
The simple but effective UPnP server for Linux is a perfect fit for our needs.

AN OLD PC
Pretty much anything will do, but for the best results we recommend a Pentium III or better.

A LARGE HARD DRIVE
If you have a large media collection, you'll need lots of storage.

Fellow geeks will relate to this: we at *APC* have a variety of old PCs lying around, and a wealth of now-dusty components. It seems a shame to throw away perfectly good hardware, even if it has passed its sell-by date. Although many council recycling depots will now accept electronic equipment, if you can put your motley collection of old CPUs and motherboards to good use, then so much the better. So, the idea is to turn an old PC into a media server — something that will allow you to listen to and watch your music and video from any networked PC in your house, and can preferably be hidden away out of sight.

If you've chosen to reuse an old PC then the chances are it already has a version of Windows installed on it. Although it's possible to use Windows XP in conjunction with Windows Media Player as a media server, it's not a particularly flexible option and in our experience it's pretty flaky, too. There's also the fact that Windows tends to become increasingly unstable unless it's rebooted every few days.

The alternative is to go for a free solution, and Linux is the obvious choice. Although many people are put off by the mere thought of the OS, distributions such as Ubuntu are now easy to use, and while you may need to venture to the command line once in a while, we've tried to keep that to a minimum here. Using Linux also means that you should be able to reuse the Windows licence associated with your old PC elsewhere, provided it's only been activated once.

INSTALL UBUNTU

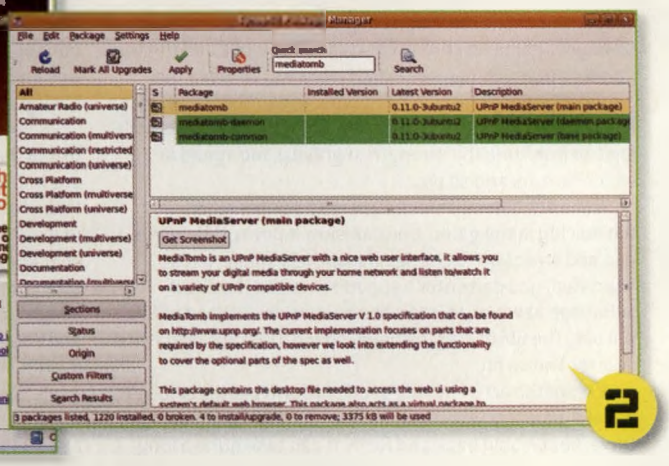
1 Head to **www.ubuntu.com**, download the ISO image for Ubuntu and burn the image (we used version 9.04, which you can also find on August's DVD) to a CD. On your media server PC, change the BIOS settings to boot from CD, pop the disc in and let the Install wizard run its magic. You'll need to enter some basic information, such as your name, the name of the system (as it will appear on the network) and a password. Once the install has finished, Ubuntu will grab some updates, then you're ready to start setting up.

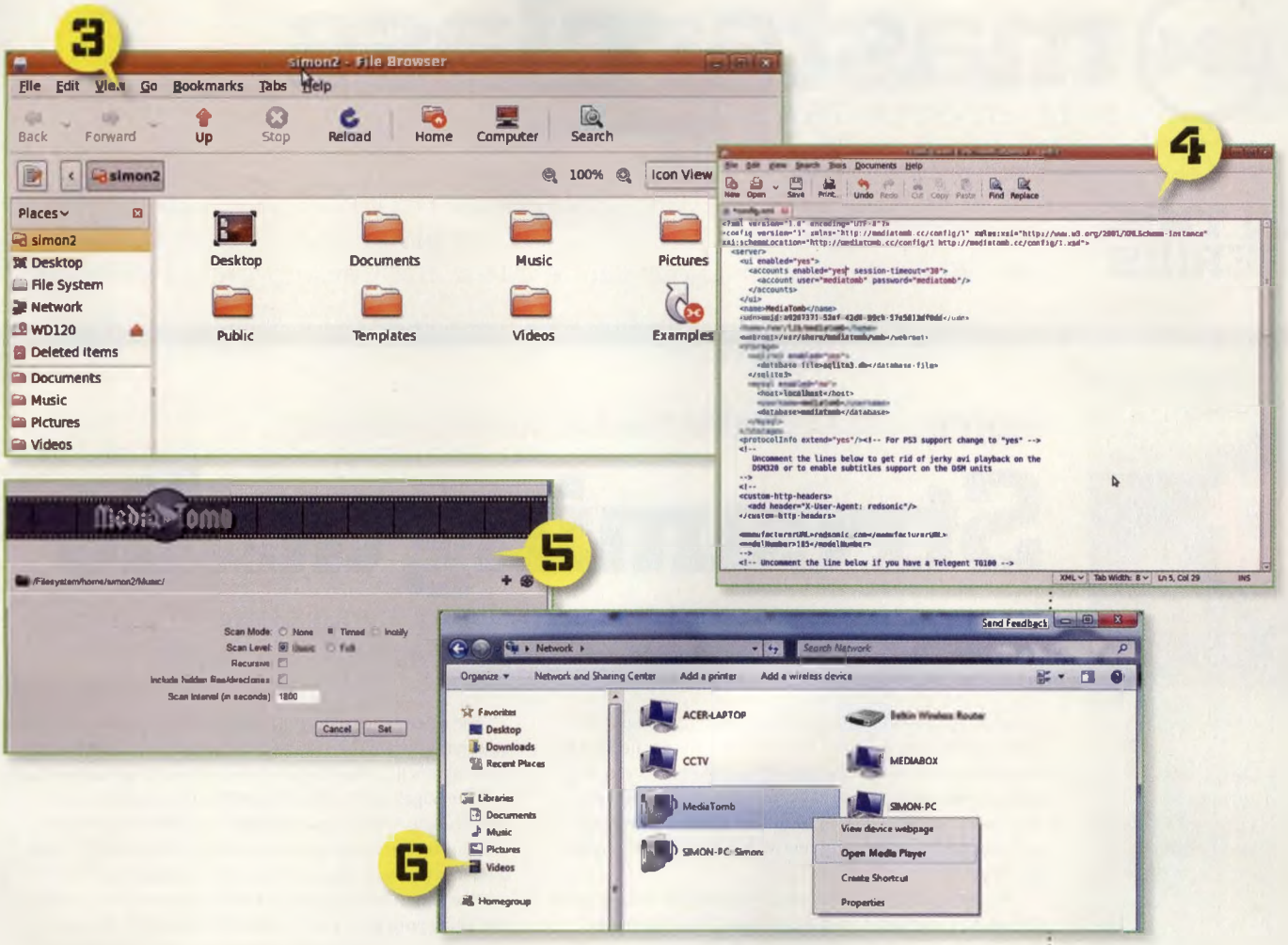
INSTALL MEDIATOMB

2 For this project we will be using MediaTomb, which is a UPnP server application for Linux. It will allow you to share media with any compatible device on your network, including Windows PCs, Macs and even an Xbox 360 or PS3. Thankfully a ready-made package is available for Ubuntu 9.04, so you don't need to do any command-line installing. Go to the top bar and click on 'System > Administration > Synaptic Package Manager'. Type MediaTomb into the Quick Search box and tick the three entries shown to mark them for installation. Next, click the green 'Apply' tick and MediaTomb will download and install.

CHOOSE FILE LOCATIONS

3 Now you need to choose where to store your media, so click on 'Places > Home Folder'. Like Windows, Ubuntu uses dedicated folders for music, pictures, documents and videos. It makes sense to use these rather than creating new ones. The only reason you would want to





do that would be if you wanted to use a small drive for the OS installation and then a larger or external drive for media storage. If this is the case, make a new folder in your chosen location; you'll assign it the appropriate function later on.

CONFIGURE MEDIATOMB

4 Now it's time to venture onto the command line; click 'Applications > Accessories > Terminal' to open it. Now type 'sudo gedit /etc/mediatomb/ config.xml' to edit the MediaTomb configuration file. You will be prompted for the administrator password you created when you installed Ubuntu. There are a few lines you may want to change in this file, depending on how you decide to manage your media collection. If you want users to be able to log in to the interface, change the '"no"' value in the '<accounts enabled="no" session- timeout="30">' to "yes" and then change the values in the line '<account user="mediatomb" password="mediatomb">' to a username and password of your choice. If you want to add support for streaming to a PlayStation 3, change the line '<protocolInfo extend="no">' to "yes". Save this, exit and then start the MediaTomb server by typing 'mediatomb' at the command line.

ADD YOUR MEDIA

5 It's time to switch over to your Windows PC and use the network browser to find your Linux media server. It will show up as a UPnP device, which — unless you've changed its name — will be called MediaTomb. At this point you need to add some media to the database, so right-click on the MediaTomb icon and choose the 'View Device Webpage' option. The interface is pretty basic, but you can click on the 'Filesystem' link and use the tree to navigate to the folders where the media is stored on your PC — 'filesystem/home/username/music' for instance. Click on the Music folder to highlight it, then click the plus sign with arrows around it to add the folder's content to the database.

You now need to choose a scan method — either None or Timed (ignore Notify). If you select Timed, you also need to set an interval in seconds at which the folder should be rescanned to check for new files. You should choose a full, recursive scan so that all your folders are added. Repeat the process for your pictures and video files.

PLAY YOUR MEDIA

6 Now that you've added some media content to MediaTomb's database, you can play it through Windows Media Player or VLC, or stream it to your PlayStation 3. Open Media Player and go to the Library screen. Under the Other Libraries tab, you should be able to see a listing for MediaTomb, with dedicated categories for music, pictures and video. Simply click on 'Music' and Media Player will list all of the content, helpfully categorised into artists and albums. Now you can access your media collection from any network-connected PC or games console in your home!

DO THIS... USE A NAS BOX INSTEAD

Keeping an old PC running for something you only use once in a while might require less initial outlay, but it isn't very power-efficient. There are some better solutions around if you're willing to spend a little money.

A network attached storage (NAS) box is the obvious choice. These are usually low-powered units running a stripped-down Linux OS that plug into your network via a standard Ethernet port. They're perfect for the basic task of serving up files.

Alternatively, many routers include USB ports, which allow you to add network-browsable storage. You may find that using such a router gives you an overall power saving, as you're running one device instead of two.

104 masterclass

STEP-BY-STEP TRAINING

IN THIS SERIES

Learn how to network every digital device in your home, everywhere from the home theatre to the bedroom. This is the ultimate home-networking tutorial on how to turn your castle into a 21st-Century digital paradise.

APC EXPERT

THE CONNECTED GUY

David Neiger has finished building the connected house for now, but we will continue to cover home theatre in future editions.

PART 11 CREATE THE ULTIMATE CONNECTED HOME

Streaming audio

How to bring digital or internet radio into your Connected Home and connect it to your streaming devices.

It is strange that in this day of networked music devices, home automation installers still believe in wiring the house for analogue sound distribution with speakers in the ceiling and speaker cables through the roof. This may be OK if you don't mind mediocre quality sound being piped throughout your house (like a shopping centre) but it really isn't the best way to go.

The main limitations with analogue sound distribution are that unless you have an expensive distribution amplifier, everyone must listen to the same thing. Remote control of devices is tedious, often using infra-red repeaters that receive the signal from the remote control unit, transmit it across yet another cable then send infra-red signals back to the device being controlled. You are limited to the type of devices you can use (many home installers still think that a CD player and tuner is as good as it gets) and, let's face it, why would you be happy with a CD full of music when you can fill a network attached storage device (NAS) with more MP3s than you could possibly listen to?

The key components to enjoying audio around the house are a PC or NAS where music files are stored, together with devices to stream music from the PC or NAS and play audio. Another component you would possibly want is a digital radio.

There are basically two types of digital radio, and the terms are confusingly often used interchangeably. One type of digital radio streams music from the internet whilst the other type receives digital radio broadcasts. Some even do both!

Digital radio broadcasts, known as DAB+, are relatively new to Australia and are presently only available in the five main capital cities. DAB+ radios receive digital signals transmitted on an unused television channel (currently Channel 9A, which is between analogue Channels 9 and 10) and decode a multiplexed AAC audio stream to give you high-quality audio plus extras such as text and potentially graphics. Since the signal is similar in frequency and power to Channel 9 as a general guide, if you can receive analogue Channel 9 clearly then you should be able to receive digital radio.

The advantages of digital radio are that it is easy to tune (as you simply select the station name rather than remembering the frequency), there are extra stations (such as Koffee, Radar and The Edge) and the sound is better than analogue radio (particularly AM) because it is clear and free of static. Some radios offer the ability to pause, rewind and even record live broadcasts, and if your radio has an LCD screen you can receive additional information such as the song being played, upcoming programs, news and weather updates. Since the radio receives free-to-air broadcasts, once you purchase your DAB+ radio there is nothing more to pay.

The disadvantages of digital radio are that you will need a (currently) relatively expensive DAB+ compatible radio to receive the broadcasts, and if you are not in a good signal area the audio will drop out from time to time, or sound as if it is bubbling through mud (like a poor-quality mobile call). In order to squeeze as many stations as possible into the limited available bandwidth, only about 48Kbit/s is available for audio, which means that, even with the more efficient AAC codec, the sound suffers from artefacts that may or may not be annoying, depending upon your hearing. Although there are a few more stations than with AM or FM, you are still limited to local broadcasters and, as yet, community radio stations have not made the switch to digital.

The other thing is to be careful if you are thinking of bringing in a digital radio from overseas, as Australia uses the newer DAB+ system rather than the DAB system used in the UK and parts of Europe. DAB uses MPEG encoding and is not compatible with the Australian DAB+ system. The US uses yet another system (HD Radio or IBOC), which is also incompatible with DAB+.

The next type of digital radio is more correctly called an internet radio. This device allows you to tune into broadcasters from around the world who stream their content over the internet using Shoutcast, Windows Media Audio or Real Audio. You don't actually need an internet radio to be able to listen to these audio streams since any PC or Mac with appropriate software and a sound card can do the job. However, in some

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places (such as the kitchen or bedroom) an internet radio is far more convenient than lugging a PC around.

The internet radio includes all of the components needed to retrieve streaming audio, including an inbuilt network adaptor (usually wireless and wired), software that links into a portal site that contains the list of stations and their URLs, a simple interface (usually similar to a conventional radio), a small amplifier and a speaker.

The advantages of internet radio are that you can potentially listen to thousands of radio stations from around the world including niche broadcasters, foreign language and independent stations. Provided your internet connection is stable and the stream uses sufficient bandwidth, sound quality can be as good as FM radio.

The disadvantage of internet radio, particularly for users in Australia and New Zealand, is that listening to the radio can quickly use up your internet quota. For example, streaming a high-quality (128Kbit/s) audio stream uses approximately 1MB of data per minute. Listen to the radio for say, seven hours a day, five days a week, and you have chewed through over 2GB of data per week. Forget about listening to internet radio on mobile devices (such as a Nokia 3G phone, iPhone or other smartphone) as the costs of doing so will be prohibitive (even on a larger data plan).

Installing a DAB+ radio is simple. Just plug the unit in, allow it to tune the radio stations and enjoy. If you live in an area where the signal is poor, you may need to move the radio around to find the best position, or you can purchase a clip that attaches to the inbuilt antenna to allow you to use your outside television antenna.

Installing an internet radio is also straightforward, provided your network is set up correctly. Since an internet radio does not use a large amount of bandwidth and generally only works with 802.11b or 802.11g, in the Connected Home we will connect it to the 802.11b/g network (rather than letting it slow down other devices on the high-speed 802.11n network). From the radio setup menu choose the wireless network option, allow it to browse for available networks (in our case Belkin) then enter the WPA key to allow it to connect to the internet. Alternatively, just plug it into a spare network point and choose the wired connection option.

Once the radio is connected to the internet, allow it to check for new firmware, and enjoy. In our experience some radios are better at handling wireless networks than others. If you continuously experience drop-outs or network errors, then you may either need to change the channel used by your wireless router (to avoid interference from other networks) or use a wired network connection.

Now with the DAB+ and internet radio installed, it is time to connect up the streaming audio devices.

There are a variety of audio devices available, including the Apple AirPort Express, the Logitech Squeezebox and Sony DLNA-enabled music systems. Another option is to use a media-centre-enabled PC (as part of a home theatre system) or even an inexpensive netbook with a reasonable USB sound card and set of powered speakers.

The first thing you should do is to consolidate all of your music (or digital assets if you prefer the technical term) on a central media server such as a media-centre-enabled PC or DLNA-enabled NAS (such as the Linksys Media Hub). Don't forget to keep a backup on a removable hard disk as well.

If you purchase all of your music from iTunes then all you need to do is keep the .m4a files on the NAS or central share where they can be accessed by any device. If you want to convert your CDs to digital files, you will need to install some ripping software.

There are many free software packages to allow you to convert CD tracks to digital audio, including iTunes itself. Note that it is technically illegal to copy music from CDs, even if you own them, but that doesn't seem to stop most people.

Most ripping software will give you a choice of codec (or format) that you want to convert the music into. Uncompressed audio files from a CD are quite large (around 640MB per hour), and whilst large hard disks can store that amount of data, streaming large files around a wireless network is not recommended.

MORE ABOUT... RADIO RECEPTION

Many internet radio stations try to conserve costs by limiting the bit rate of the audio they stream, and if the station is located in some far-flung place in the world (with limited internet access) the stream is unlikely to be reliable, resulting in highly compressed (gurgling) choppy audio. Since the data stream has to make it from the server to your home at a fairly constant rate, congestion, network faults and even bandwidth throttling can easily interfere with your audio, particularly during peak internet usage periods in the afternoon, evenings and weekends.

If you purchase a standalone internet radio (rather than just using your PC or Mac) you are also relying upon the manufacturer to maintain their portal. Some portals (such as the Reciva radio portal used by Oxx internet radios) are well-maintained and allow users to submit new URLs and advise the portal managers when stations change URLs or discontinue broadcasting. Other devices either use their own portals (which aren't well maintained) or require you to tediously enter the URL for stations you want to listen to. Make sure you do your research before you spend your money, as some internet radios bluntly are not worth buying!

Logitech
Squeezebox
Logitech
HOME
HOW IT WORKS
PRODUCTS
COMMUNITY
PARTNERS
SUPPORT
Download SqueezeCenter
Once your music is stored on your PC, use SqueezeCenter to stream music around the house.
Download SqueezeCenter 7.3.3
SqueezeCenter (formerly SlimServer) provides access to your music library through Logitech Squeezebox and Transporter® network music players. Simply install SqueezeCenter on every computer you have music stored on, and your Squeezebox does the rest.
SqueezeCenter includes contributions from our worldwide community of developers who help incorporate your feedback to expand and improve the ways you connect with and share the music you love.
What's new in SqueezeCenter 7.3.3
This SqueezeCenter update addresses a number of minor bugs and issues reported by the community. Please read the release notes for a complete list of bugs and issues addressed.
For details, read the full release notes.
Using Snow Leopard?
OS X 10.6 users please download version 7.3.4.
Beta and pre-release versions of SqueezeCenter are also available.
SqueezeCenter Features
Allows playback of your music library through Logitech Squeezebox and Transporter
Automatically imports iTunes library and playlists (Windows and Mac), and metadata tags
Browse and search by title, artist, album or genre
Select Download
Windows 2000/XP/Vista
Mac OS X 10.3 - 10.5
Debian/Ubuntu
Linux RPM
Perl Source Code (tar.gz)
NETGEAR ReadyNAS Pro
NETGEAR ReadyNAS NV/NV+/Duo
The download of any Squeezebox or Transporter firmware included with this software is subject to legal terms and conditions.

MORE ABOUT... AUDIO CODECS

There are basically two types of audio codecs: lossy and lossless. Lossy codecs generally produce small files (which allows you to store more music) but, as the name suggests, some audio data is permanently lost, which is why an MP3 file will never sound as good as a CD. The more you compress the file, the more music data is lost until there comes a point where the audio suffers from annoying artefacts (such as gurgles, twittering or metallic noise). Each person perceives artefacts differently, and what may sound like CD quality to you may well drive an audiophile (with their golden ears) crazy! As a general rule if you use MP3 you should encode audio at no less than 128Kbit/s but ideally 192Kbit/s or above for reasonable audio quality. Using a variable bit rate will allow you to save space by encoding parts of the music at a lower bit rate whilst preserving higher bit rates for more complicated parts.

Most ripping software will automatically compress the audio data into another format (such as MP3), so that one hour of music only uses around 60MB of space. The most popular codec is MP3, as this is supported by just about every streaming audio device available. Unfortunately, MP3 is no longer the most-efficient codec both in terms of file size and audio quality. Depending upon the devices you want to stream audio to, you may obtain better quality audio (with smaller file sizes) by using WMA (Windows Media Audio), AAC (iTunes), OGG or FLAC.

WMA is a more-efficient codec, which means that you can use a lower audio bit rate whilst still preserving sound quality. WMA files encoded at 128Kbit/s can sound as good as MP3s encoded at around 192–256Kbit/s (but this is subjective). AAC is even more efficient, with 128Kbit/s encoding sounding nearly as good as the original CD (although, to my ears, AAC sounds somewhat flat and lacking in treble). OGG is another option, although not many commercial audio devices support it.

The other option is to use a lossless codec such as FLAC (free lossless audio codec). FLAC, as the name suggests, uses a different encoding method to shrink the size of audio files whilst preserving all of the audio data. FLAC files truly sound as good as the original recording, however they tend to be significantly larger in size (usually around 320-500MB per hour of music) and not as many devices support FLAC. That being said, most people are satisfied with MP3 or AAC and are prepared to sacrifice some quality for convenience.

If you have converted most of your CD collection to digital files, you will potentially have thousands of files. You could let your audio device randomly shuffle tracks, but it may not be the best option if, say, Beethoven comes on in the middle of a dance party, followed by some heavy metal. Ideally you should sort your music into folders so that you can either listen to music by genre, or at least keep the shuffling consistent. Remember to make the most of the ID3 (metadata) tags in the MP3 files and use a consistent and meaningful naming approach to files. Ripping software that uses the Gracenote database can automatically do this for you (by identifying the artist, song title and album) but if your software does not support this then make sure you name the files properly. I guarantee you will not be able to identify track2_album41.mp3 in a few days' time!

Now that your music is safely stored as files on your PC, Mac or NAS (and backed up), we can connect a Squeezebox to stream music from the network. Unlike DLNA devices, which can connect to a PC running Windows Media Center directly, a Squeezebox uses proprietary software (SqueezeCenter) to stream music to the device.

The first step is to register your device and download SqueezeCenter from **www.logitechsqueezebox.com.** Meanwhile, set up the network on your Squeezebox device, choosing whether you will use a wireless network (in which case you need to enter the network SID and the WPA password) or a wired network. Choose to obtain an IP address automatically and initially connect to the Squeeze network. The device may attempt to update firmware if required. Once the firmware is updated you can choose whether you stream music from your PC (by specifying its IP address) or the Squeeze network.

Install the software on your PC and select SqueezeCenter from the menu on your Squeezebox. The device will automatically find the server and allow you to stream music from your PC.

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and other computer retail outlets.

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IN THIS SERIES

Ash Nallawalla continues his Masterclass, focusing on online marketing. This will cover online advertising, web site monetisation, network marketing, blogging for profit, affiliate marketing... and more!

APC EXPERT

ASH NALLAWALLA

Ash Nallawalla manages natural and paid search traffic for some of Australia's largest web sites. He is an internationally acknowledged expert in search marketing and he previously operated an SEO training business. Ash can be contacted at *ash@melbpc.org.au* or via his blog at **www.netmagellan.com.**

WHAT'S NEXT?

PART 3
DECEMBER '09
AFFILIATE MARKETING
Making money online.

PART 2 WEB ANALYTICS

Google Analytics

Google has generously provided an excellent, free search analytics tool. Let's put it to good use for online marketing.

We'll assume you already have a web site. Whether it is search-engine optimised or not is unimportant for this discussion, because you need to measure your web site traffic from Day One.

You need a Google account, available at **https://www.google.com/accounts/**. This can be an existing Gmail/Gtalk/AdSense or similar account, or you'll have to create your first Google account. The email address is your login name and it can be at your company, ISP or elsewhere.

Once you have logged in, you are in the Analytics Settings, where you will create a new profile. You select 'Add a Profile for a new domain' (even though your web site could be "old"). You provide the URL of the site you would like to track.

The Google Analytics (GA) site contains a good deal of help, so we won't repeat every step here. You need to get the tracking code (unique for each site you wish to track) and drop it in the code for every page of your site. These days, most web site architectures have a way to include a common footer for the whole site.

DASHBOARD

The deceptively simple dashboard view is the pulse of your web site's health. Let's look at one example — my humble blog at **netmagellan.com**. It's not well-known and it has stayed that way because I don't write long, insightful posts. Recently, I made an exception by writing one such post.

At a glance you can tell that the traffic peaked one day after the post, and it dropped back to previous levels within six days. Writing a good post alone won't bring the extra traffic. I had seen a good post on another web site and mentioned in my comment there that I had written a related post on my blog. I also Tweeted about it (on **Twitter.com**, for those who haven't heard of that great microblogging service), so this brought the extra traffic.

On closer inspection, I found that, prior to that post, I was getting about 20–30 visits per day, but I gained new readers and thereafter my average has risen to 40–50 visits.

The normal monthly view can be adjusted to any period of observation, such as a comparison with the previous month. There is a handy drop-down arrow next to the date range.

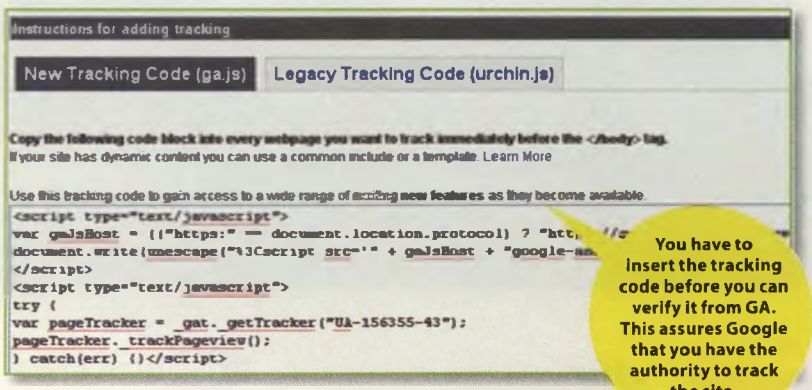
Now let's look at the most important metrics that an SEO or web site owner needs to check.

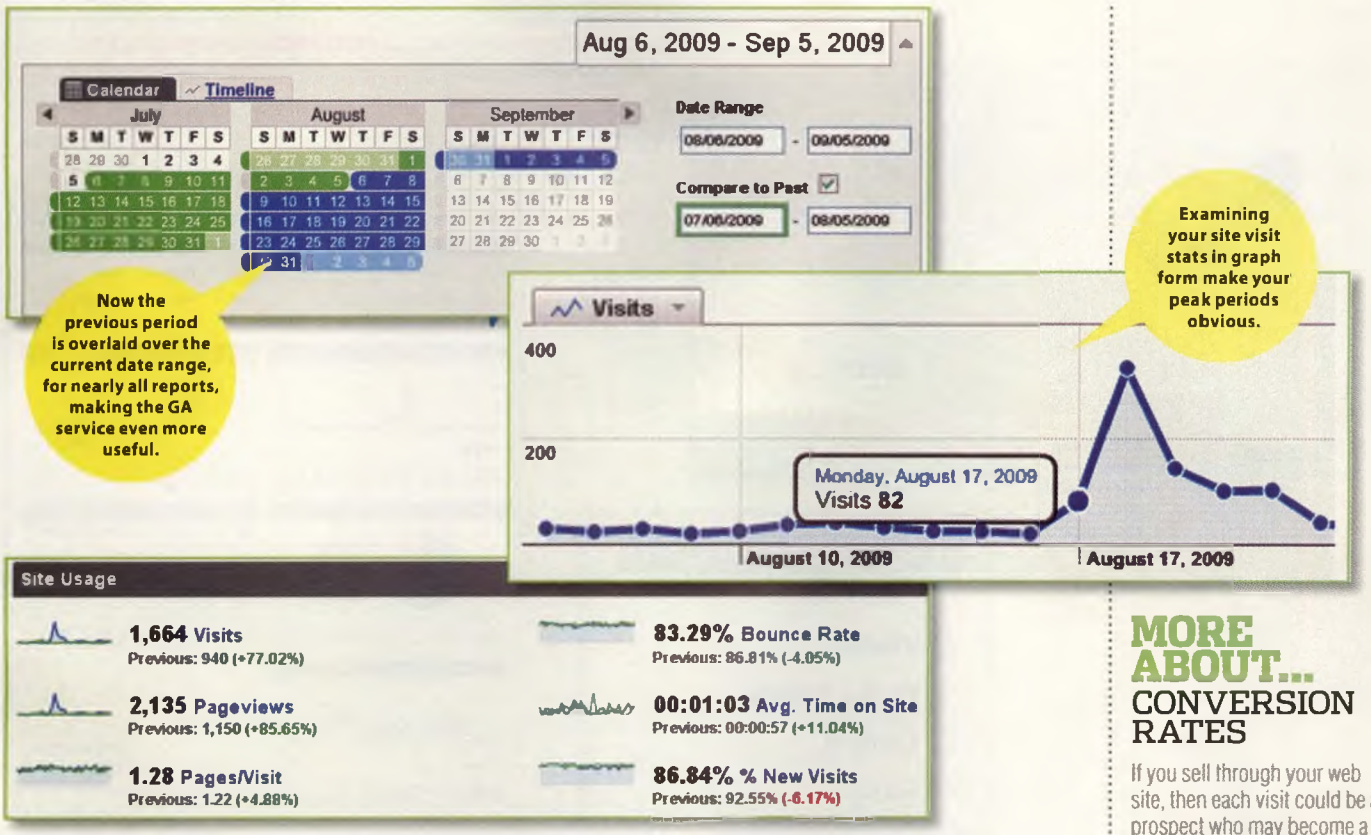
VISITS OR UNIQUE VISITORS?

A visit is no more than one browser session for a pre-defined period, such as 30 minutes. If a visitor looks at a page, say, by clicking a link in an email, then closes the browser, then he clicks another link in that email, and opens another browser instance, this counts as a second visit.

The nature of your web site or your interest in some aspect of it will determine whether you want to count the number of visits per day or the number of unique visitors. If each visit leads to a desired action, eg. every visit to a directory could lead to some interaction between the visitor and advertiser, then you must track this metric both in total and per advertiser. You can tell the advertiser how many exposures they received, because they might not ask each customer where they were found.

If you are measuring the brand impact of your web site, you would want to know how many unique individuals were exposed to your brand per day or month. However, this is not a good metric because it is difficult to track accurately. Large corporations might route all their employee web sessions through one proxy server (one IP address) and all computers might use the same type and version of browser and operating system, so it would be impossible to say whether your site received one unique visitor or one thousand separate individuals.





In the early days of the web there weren't any proxy servers or more than one browser, so unique individuals were easier to measure, but even then, university terminals were shared by more than one person. Now we have cookies, caches and so on.

Uniqueness also requires a time frame. If one person visits twice a month, is that one unique or two? The time scale is up to you.

PAGE VIEWS

You would be interested in page views if you were selling advertising impressions, such as banner ads. If you visit a major portal run by a news organisation and leave it sitting on a particular page, you may find that the page refreshes itself every so-many minutes. Ostensibly this is to ensure that you get any freshly loaded news, but it also generates an impression for all the display ads that appear on that page. Usually you will see new ads, but sometimes the same ad might display more than once.

BOUNCE RATE

If a visitor enters the web site and leaves without loading any other page, that is a bounce. This is usually shown as a percentage collectively across all visits over a month. A low percentage is usually a sign that most visitors were inspired to explore the rest of the web site. Sometimes, a 100% bounce rate might not be bad, if your goal is for the visitor to view an offer or an ad that is repeated on every page.

In the case of my blog, the popular article resulted in my bounce rate dropping from 86.96% to 83.38% the previous month.

NEW VISITS OR REPEAT VISITS

A low number of new visits means that you need to work on promoting the web site, but it could also mean that you have saturated your niche if you have a large number of repeat visitors. My new visit rate dropped from 92.46% to 87% because some of my readers came back to read more posts.

AVERAGE TIME ON SITE

The average time spent by my visitors increased marginally from 58 seconds to 1 minute, 2 seconds. This suggests that most visitors read just one long post or a couple of short ones. I have another site, which is a directory. It has a 5 minute average time on site because the registration and site submission process takes that long.

MAP OVERLAY

GA provides a world map showing where visitors came from. Unless you carry advertising, or are writing for a limited geographical audience, this is just an interesting factoid. Some advertisers need to know whether you target a certain country or region; this map can help you to convince them. If you have a travel web site and you notice visitors from an unexpected part of the world, you might want to write some content for that audience.

BROWSERS

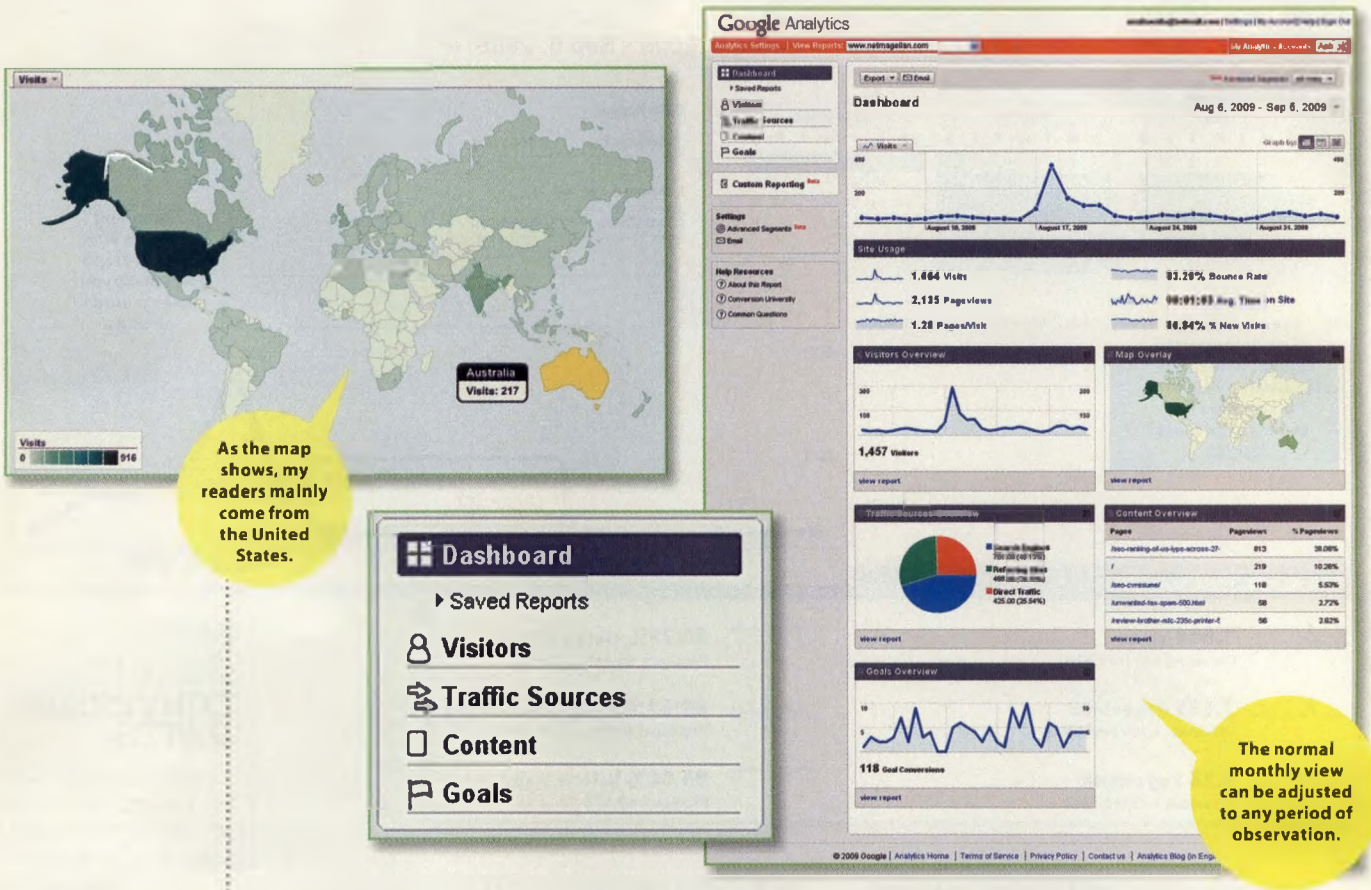
It's important to know which browsers are used by your audience. The default list of browsers hides important details that you can see by clicking the name of the browser. These days, a techie blog such as mine gets more

MORE ABOUT... CONVERSION RATES

If you sell through your web site, then each visit could be a prospect who may become a customer (a "conversion"), so you need to understand your conversion rate. If you sell very expensive items, a person might visit numerous times, perhaps to show an item to a spouse or colleague for a second opinion. If you make 10 sales for every 100 visits, then you know that you have a 10 per cent conversion rate.

PAGE VIEWS

For GA, a page view equates to the tagging code being executed properly, which means the page has to be loaded sufficiently, or completely if the code is at the bottom of the page. Some people might leave a page before the GA code has a chance to execute, say by clicking an ad, or by stopping the page from loading.



MORE ABOUT... FACTS AND FIGURES

GA also shows you obscure facts such as IE8 users spend twice as long on my site as do IE7 and IE6. I also note that one visitor uses 8-bit colour and another 12-bit. Ouch! I can't do anything with that information, but it's there. I checked screen resolutions and was surprised that not one visitor used 800 x 600 pixels. This is important if you are using a fixed width page, because you don't want users to scroll sideways to see the whole width of the page. I found that 2% had JavaScript turned off and 11% had no Java support. My blog does not use Java apps and is not crippled if JavaScript is off, so this was comforting.

visits from Firefox users than Internet Explorer users. I can see that most of these users are running the latest version.

My Internet Explorer (IE) audience is nearly evenly divided between version 7 (40%), 8 (33%) and 6 (27%). You may have seen web sites that turn away anyone with version 6 because it breaks many pages. I can't recommend that approach because many corporate users are not going to upgrade and they pay Microsoft for supporting that version.

KEYWORDS

SEOs can't get enough of keywords, particularly to find out which ones brought the most traffic. I was a little let down because my top two searches were for 'SEO resume' and 'SEO CV' but I didn't get any job offers (that's a joke, by the way). I already know the most popular posts, but now I can see different variations of a single theme, eg. 'Wynn Las Vegas promo code' – an obscure, tiny post I made once. It is consistently in my top 10 searches, so I should try to capitalise on it, say by joining the Wynn hotel affiliate program. A small post about the Brother MFC-235C printer attracted 31 distinct keyphrase visits.

CONTENT DRILLDOWN

It may be valuable to check your popular pages (such as a sales page) to see what paths your visitors took to reach there and how many went to the purchase page. Say, you have three product detail pages and find that most people who get to Product One proceed to make a purchase; of those who get to Product Two, most go to either Product One or Three, or they leave the site.

This might suggest that something is wrong with it. It might be something you overlooked, such as not mentioning the price, or it might need more investigation, such as its colour being out of fashion. Your Product Three visitors tend to check out the other two products and make a purchase of Product One or Three. This might suggest that this product might be the next most popular but you may need to offer a feature comparison page to help such visitors.

GOALS

A powerful GA tool is goal measurement. Typically, any success event can be a goal, such as making a purchase, filling out a form, or reaching a particular page. My blog does not sell anything, so I have two arbitrary goals — my resume and my non-profit page. The first has some value to me, for it tells me how many people are curious about my background. After all, my blog is one of my advertisements and it might lead me to new challenges if the right person comes along. GA does not require a special tag to be dropped on the success page. You merely provide its URL in the goal setup process and anyone reaching that page will trigger the success event.

This month my goal visits rose by 8.74%, suggesting that some of the new visitors were interested in my resume. I could assign a dollar value to a goal but this is better done by an e-commerce site, so that they can compute revenue per conversion.

We have just skimmed the surface of Google Analytics. Once you have installed it, you can explore it at your own pace.

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Spring 2009

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HIGH-PERFORMANCE PLAYTIME

SENNHEISER PXC 310 BT

Wireless is the 'in' word nowdays. The new PXC 310BT headphones from Sennheiser use Bluetooth technology to allow for great sound without wires. The integrated NoiseGard (anti-noise) function blocks up to 90% of background noise, which makes it perfect for those of us who listen to our music on public transport. A new TalkThrough function uses miniature microphones on the headphones to filter out the sounds of voices, allowing you to hold conversations at the press of a button. Volume and function controls are included on the earpiece to save the hassle of fiddling with your music device. Bluetooth and in-flight capability make this an appealing unit. ***CZ***

01

CONTACT	Sennheiser
ONLINE	www.sennheiser.com
PRICE	TBA

LEAPFROG TAG JUNIOR

Using dotted paper technology similar to the LiveScribe Pen, Leapfrog's Tag Junior gives kids a tool that is not only fun to use but also acts as a reading aid. The controller is used to 'stamp' sections of specially marked Tag books that will then either read the text that is highlighted or play sound effects relevant to what it is pointing to on the page. Designed for two-to-four-year-olds, the Tag Junior is a great device for introducing kids to reading or as a simple play toy. The books that accompany the device are thick and sturdy and all have a central educational theme. The Tag Junior may look like a toy but it is actually a highly complex educational device. ***CZ***

02

CONTACT	Leapfrog
ONLINE	www.leapfrog.com
PRICE	$69.95

TARGUS CHILL MATS

Notebooks are more frequently being used as desktop replacements by computer users who are after a bit more flexibility in where and how they can work. Promising consistent operating temperatures, notebook-cooling devices have become more popular. Targus has released a range of 'Chill Mats' that are designed to ensure optimum airflow around your netbook, notebook or Mac while at the same time protecting your furniture and even yourselves from wear and tear. Ergonomically designed to sit on tables or on laps, the Chill Mats make nursing anything with a seventeen-inch screen or less a lot more comfy. . . and safer. ***CZ***

03

CONTACT	Targus
ONLINE	www.targus.com.au
PRICE	$54.95 ($39.95 netbook size)

USB ASHTRAY AND AIR FILTER

Here at *APC* we don't condone smoking, but if you're one of those computer users that feels compelled to light up at your desk, then this USB ashtray is a must-have. Your USB plug is used to power a small fan that sucks cigarette smoke from the surrounding air and pushes it through a tiny carbon filter that removes most of the harmful chemicals and odours associated with smoking. And, if you're a bit shy about the habit, the top flips down to look like a harmless model car. Although it only works in removing smoke from the immediate area, there is no denying the effectiveness of this little device. All you have to do now is try to quit. ***CZ***

04

CONTACT	Geeky Gifts
ONLINE	www.geekygifts.com.au
PRICE	$19.95

LG GD910 3G WATCH PHONE

05

Remember when you were a kid and you used to run around the backyard talking into your watch? Well, now you can play James Bond with the real thing! LG has unveiled the world's first touchscreen watch phone with 3G Video Telephony service and GSM Quadband Network capabilities.

The GD910 is a sexy little beastie with a curved, tempered glass face mounted in a high-quality metal casing. It is the first touch watch phone in the world to feature 7.2Mbit/s 3G HSDPA compatibility, which enables high-speed data transmission and video phone calls as well as SMS. Available now in the US, with Australia coming soon. ***CZ***

CONTACT	LG
ONLINE	www.lg.com
PRICE	US$1,270

LOGIC STUDIO

06

When it comes to home music recording and basic audio production generally, Mac users get a great freebie in GarageBand, a fun and simple-to-use musical sequencer/MIDI all-in-one app which ships with every new Mac as part of the iLife creativity suite (and basically blows any similar Windows giveaway out of the water). But what if you've reached the (considerable) limits of GarageBand and want to step into more 'pro' territory? Well, Logic Studio's just what you need: it's got everything needed to make professional-grade music, with dedicated writing, recording, editing, mixing and even performance functionality built in. Rock on. ***PD***

CONTACT	Apple
ONLINE	www.apple.com.au
PRICE	$749

SONY CMTBX20IB MICRO HI-FI

07

Chances are not every piece of music you want to listen to is crammed onto your iPod. Sony has released a new Micro Hi-Fi that gives you the best of both worlds via an integrated, recharging iPod dock as well as a CD player and AM/FM radio. If that's not enough, there are also audio in ports at the rear if you want to connect another device, whether it be a record player or your PC.

You can also control the full functionality of your iPod through the Hi-Fi system's remote control. 50W speakers give out a decent, clear sound with an added bass boost function to get the room shaking. At less than the price of a decent iPod, this Hi-Fi is a steal. ***CZ***

CONTACT	Sony
ONLINE	www.sony.com.au
PRICE	$399

DICAPAC WATER PROOF SLEEVES

08

It makes sense that we'd all want to keep our favourite gadgets safe. A Korean company called DiCAPac has come up with a novel way of making sure that most of our handheld devices are safe to use both near and even under the water! What is essentially just a custom fitted, water-tight plastic sleeve, the DiCAPacs are available to suit most camera shapes and sizes including DLSRs. All you have to do is slip it over your camera body, put your lens in the mount, seal it up and off you go. Surprisingly, they are waterproof to a depth of ten metres. Sleeves are also available for camcorders, iPods, PSPs, smartphones, radios or whatever else you want to put in them. ***CZ***

CONTACT	DiCAPac
ONLINE	www.dicapac.com
PRICE	From US$29.95

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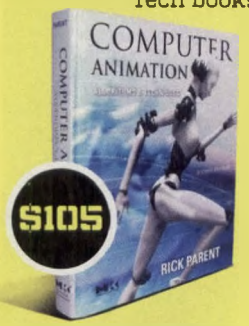

COMPUTER ANIMATION: ALGORITHMS & TECHNIQUES
elsevierdirect.com.au

The second edition of Rick Parent's *Computer Animation* focuses on the many recent developments in animation technology, including fluid, human figure and soft body animation. The book includes up-to-date discussions of Maya scripting and the Maya C++ API, programming on real-time 3D graphics hardware, collision detection, motion capture and motion capture data processing.

NETOBJECTS FUSION 11
mcgraw-hill.com.au

How to Do Everything: NetObjects Fusion 11 explains how to navigate the interface, configure the toolbars and panels, create web sites and pages, position and format text, and include graphics and audio. You'll get tips for designing and structuring your site, and adding advanced functionality. This book is an absolute must for any NetObjects user.

Revo IKON digital radio / iPod dock

The introduction of digital radio has opened the floodgates for new products. Revo has just released its hero product, the IKON, in time for Christmas.

iPod docks and digital radios have become the must-have items around the home this Christmas. They have all but replaced the humble Hi-Fi as the sound systems of choice for many technophiles. But why have two gadgets when you can combine them into one? The Revo Ikon is a multi-format digital radio that combines the benefits of high-quality radio reception with easy access to your iPod's music library. Ikon is also capable of receiving DAB+ and internet radio — as well as conventional FM radio with RDS. Where available from the broadcaster — colour station logos, station descriptions, track and artist information, news headlines, and other information broadcasted will be displayed on the full colour 3.5in touchscreen. Ikon will also wirelessly stream digital music files from any 'connected' PC or Mac, displaying full-colour album artwork and track information.

Patented 'Balanced-Radiator' loudspeaker technology combines attributes of an NXT flat panel speaker with the pistonic movement of a conventional loudspeaker to provide a great range of sound that dwarves its physical size.

The Ikon may not be cheap, but you get what you pay for.

Christopher Zammit

CONTACT	Revo
ONLINE	www.revo.net.au
PRICE	$699

50 WORDS
. . . about what your Clone would do for you!

Our friends at Warner Home Video have given us 20 box sets of *Star Wars: The Clone Wars - The Complete First Season* to give away. All you have to do is tell us in 50 words or less about your Clone. We know you don't have one. . . but if you did, tell us what you'd get it to do for you! The prize pack consists of a 4-disc set of *Star Wars: The Clone Wars* DVDs that feature all 21 episodes from season 1. . . and extras!

Entries close November 16. Winners will be contacted by email.

Email your entry to:
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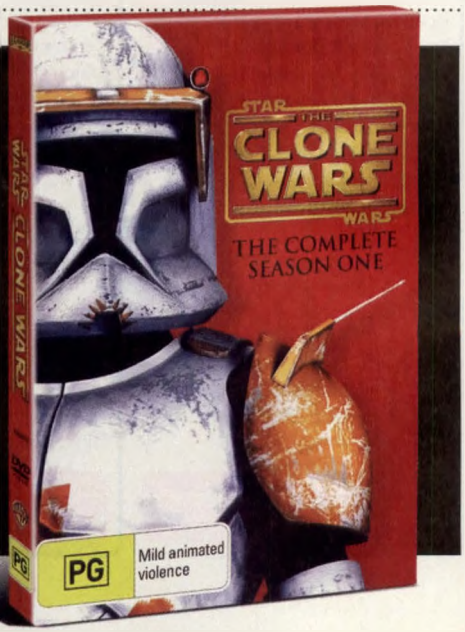


SD CARD CAMCORDERS

The new standard in image capture, one SD card can hold hours of [illegible] thousands of photos. Best of all, a simple copy and paste will transfer everything from your camcorder to your PC or media hub ready for editing or viewing. Unlike tapes, the card can be used repeatedly with no loss in image quality.

What's hot & not

TECHNOLOGY THERMOMETER

TAPE CAMCORDERS

The standard recording medium up until a few years ago, tapes have been rendered obsolete by the ease and affordability of HDD and SD card camcorders. They utilise decades-old technology, take forever to transfer to your PC and can only hold a measly 80 minutes of footage. How archaic!

BLU-RAY PICKS OF THE MONTH

CONTACT Paramount Pictures
ONLINE www.paramount.com.au
PRICE $42.97 (three-disc set)

STAR TREK

Kirk and Spock return in this reimagining of the classic sci-fi franchise by the creator of *Lost* (J.J. Abrams). More like a prequel, the story concentrates on how the violence and destruction wrought by the grief-stricken Romulan, Nero (Eric Bana) brings the young Starfleet Academy cadets together to form the now-famous Enterprise crew. Amazing effects, great action sequences and a good, solid story make this a great piece of entertainment regardless of if you loved or hated the originals. Leonard Nimoy shows up to give the story a great twist that will leave fans smiling. Don't be fooled, *Star Trek* is not just for the geeks. ***CZ***

CONTACT Universal Pictures
ONLINE universalpictures.com.au
PRICE $44.95

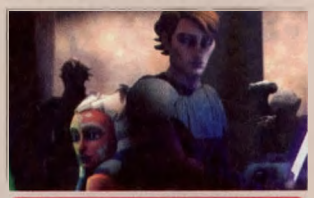
LAND OF THE LOST

Will Ferrell's films can be pretty hit and miss. Luckily, with *Land of the Lost*, you get a lot more hits than misses. Based on the '70s TV series of the same name, the story follows Dr Rick Marshall (Ferrell) as he and an assistant set out to prove the existence of alternate universes. Along with a country hick who is showing them through a series of caves at the time, they get transported to another universe which is inhabited by everything from dinosaurs, caveman and a race of lizard people determined to take over the world. Great visual effects and plenty of sight gags make *Land of the Lost* a surprisingly good family film. ***CZ***

CONTACT Paramount Pictures
ONLINE www.paramount.com.au
PRICE $39.95

MONSTERS vs ALIENS

Reese Witherspoon plays the central character of Ginormica, a regular girl who gets turned into a giant when hit by an asteroid (hence her name). When she expectedly freaks out and does some damage, she is locked away by the US military with other 'monsters' who are just as scared and confused as she is. A subsequent alien invasion sees the military turn to their prisoners for help in which the monsters are promised freedom if they can successfully stop the invasion. As expected from Dreamworks Pictures, *Monsters vs Aliens* is an impressive piece of digital art with a solid character-based story. ***CZ***



CONTACT Warner Bros.
ONLINE www.warnerbros.com.au
PRICE $ to come

STAR WARS:THE CLONE WARS

What? *Star Trek* and *Star Wars* in the same issue? This is geek heaven! This popular CGI TV series is set between Episodes 2 and 3 of the films: *The Clone Wars* follows the lead *Star Wars* characters as they set about fighting the war against the separatist movement. *The Clone Wars* has kept the look and feel of the original films with many scenes looking just as good as their big-screen predecessors. The series is dark and gritty with lots of action and a surprising amount of violence for an animated show. This is definitely one for the fans, although newcomers who give it a chance will most likely enjoy it. ***CZ***

TV on your mobile

Optus expands its mobile TV offering

Optus has added nine new TV channels to its mobileTV network. For either $1 per day or a more economical $3 per month, Optus 3G users can now watch over 25 channels on the go. New additions include MTV's The Hills, Sky News live, South Park, Comedy Central — The Daily Show, Cartoon Network's Powerpuff Girls, the hit ABC Comedy Summer Heights High, The Wiggles, Bob The Builder, Rage and the ever popular Wallace & Grommit. ABC Live and SBS Live are also available and are both free to access. Users also have access to the global community 'EyeVibe', where they can upload, watch or forward videos made by other members. Each video costs the same as a regular MMS. New personalised channel lists make sorting through all this new content a breeze. Now there should always be something to watch on the go.

Christopher Zammit

CONTACT Optus
ONLINE mobile.optuszoo.com.au
PRICE $3.00 a channel per month

Quikfix
New releases

EBERRON UNLIMITED
Turbine recently announced the 'totally free' Dungeons and Dragons: Eberron Unlimited. Free to play? Doesn't sound like the standard model for an MMO, what's the catch? Let's see... roll a character and go kill-crazy on all manner of beasts? Free. Go solo or join up with friends? Free. Ah, I see now. Micro-transactions. Visit the in-game shop to buy potions, weapons etc using either points or *cash*. There's always a catch. Check out *www.ddo.com* for more details.

BLOOD BOWL
Another blast from the '90s gaming past, Blood Bowl is the video game adaptation of Games Workshop's famous tabletop take on American football (if it wasn't set in America but rather the Warhammer universe of elves, orcs, dwarves and such). Expect lots of bone-crunching touchdowns (and dirty play). Available from OVS Software on PC, 360, PSP and DS.

Flipnote Studio

Peter Dockrill indulges the animator within.

ONE AT A TIME
If you're in the market for a free, portable, downloadable animation studio... *this is it.*

Several years ago, when this writer was just a wee lad, there was a program available for the PC which tantalisingly promised limitless creativity for the budding (wannabe) animator: it was called Disney Animation Studio, and it provided all the tools one needed to dabble in the art of cel animation (and at a crisp 680 x 480 VGA resolution, no less). Due to a chronic shortage of (ahem) pocket money at the time — probably all spent down at the local video arcade, *those* were the days — he sadly never realised his dream purchase. But have no fear: Nintendo's latest killer app designed to lure consumers to the fledgling DSiWare channel is here. It's called Flipnote Studio and, funnily enough, it actually offers a lot of what Disney Animation Studio did: essentially, it lets you re-become a kid drawing DIY cartoons in the corner of your math textbook. With 'onion skin' transparency so you can see the frame before, Flipnote is capable of producing quite impressive little animations, and you can add colour and effects to boot. A perfect way to pass the time on the bus, and *it's free* too! (The young me would never have believed it).

AVAILABLE PLATFORMS: PC-DVD, Wii, PS3, PSP, XBOX 360, NINTENDO DS

CONTACT	Nintendo
ONLINE	www.nintendo.com.au
PRICE	Free
✔	Quick and intuitive; no end to the fun to be had.
✖	Pretty simplistic, but at this price who's complaining?
VERDICT	★★★★☆

Tiger Woods PGA Tour 10

The three-click-swing is dead; **Troy Coleman** rejoices.

EA really has been surprising us with its sporting titles lately; last month we were blown away by the depth and quality of Fight Night Round 4 and now by the insanity that is Tiger Woods PGA Tour 10. To be honest, it's been a while since I've given much time to a golfing title; there's only so much unnatural three-click-swing I'll put up with. PGA10 is a new beast entirely, and places power and control in the left hand with its new analogue-stick-swing; the margin for error is huge and shot consistency is tough at first, but it's such a satisfying control scheme. From the intro, there's really two directions a player can choose in the game: use the character creation tools to build a custom character — freckles and a flaming red mullet just scream golf — and follow a five-year career path of a struggling nobody start-up; or if a quick whack is all you're after then choose from one of the 30 pro golfers available and start swinging. Of course, playing Tiger Woods means playing with maxed out stats, so playing with any other is just gimping yourself. Online play is fully supported and as well as some long drive, nine and eighteen-hole competitions, players can take part in daily, weekly or play-the-pros tournaments. These events are often split into classes and handicap limited to keep things on the level.

EASY TIGER
Revolutionary new swing controls mean PGA10 has it where it counts — and then there's Tiger Woods, too.

AVAILABLE PLATFORMS: PC-DVD, Wii, PS3, PSP, XBOX 360, DS

CONTACT	EA
ONLINE	www.easports.com
PRICE	$99.95
✔	Complex; fully-featured golfing.
✖	Horrible animations with atrocious VO work; tricky menus.
VERDICT	★★★★½

Toprate

You've gotta try...

iPHRENZY

The iPhone and iTouch have come a long way in terms of becoming a viable gaming platform with developers thinking out of the box and farther afield than simple tap-tap games. For me, what started out as browsing the kids section for something to distract the rugrats quickly turned into a full-blown, arm-scratching addiction that is actually starting to significantly eat into my PC and console time. Better still, if you make careful game selections, there are some real gems out there that are ridiculously cheap. And so, I'll slap my thigh, spit out a wad of tobacco and present you with my two daughters, I mean, two games with the same theme — farming. For $1.19, Farm Frenzy packs a lot of punch: manage your water and feed supply for chickens, sheep, cats, dogs and cows as you harvest eggs, wool and milk to process into refined products for sale at market — mind the bears. Also at $1.19 is Ranch Rush, which focuses on growth of saleable crops, produce and general farm/resource management. Warning: both games are highly addictive. Download them today directly through the iPhone or iTouch.

VEIL, OR HEIL?
'Veil powers' add a little bit of supernatural charm to your regular, everyday WWII arsenal.

BANG-BANG
Of course, the 'standard' complement of upgradeable conventional weaponry is still on tap.

PLAN 9 FROM OUTER STEIN
If you can get past the cheesy D-grade setting and plot mechanics, there's a lot of Nazi-slaughtering fun to be had here.

Wolfenstein

Troy Coleman gets back to some re-invented-old-fashioned Nazi shakedown and takedown.

The Wolfenstein series has come a long way — what started out as a stealth shooter with a ridiculous viewing perspective has morphed through seven iterations into the first-person, outrageously over-the-top, action shooter that we now hold in our calloused, blood-stained hands. Set in the fictional town of Isenstadt, players take on the role of the smouldering B.J. Blazkowicz, who more or less singlehandedly overthrows the Nazi's attempts to utilise the powers of a dark occult called the Black Sun to shift the outcome of the war in their favour. Groan. The story really is terrible in that D-grade-action-film way, and as soon as that concept is accepted, then the game starts to be a good bit of fun: Nazi-slaughtering fun.

At the core of Wolfenstein is a very straightforward run-and-gun shooter with the 'standard' complement of upgradeable game-era automatics, rifles, launchers and grenades, which all feel unique and quite nice to get down to a bit of wetwork. Players also gain the use of a medallion early in the game that grants players 'veil' powers such as special sight, slowing time and bullet-absorbing shields. Online multiplayer is also available and is far more compelling than the single-player game. There are three classes to choose from: engineer, medic or soldier, and a pretty stock selection of scenarios to run around in, but as with all PvPing, there's definitely some fun to be found. When all is said and done, this latest iteration of Wolfenstein is worthy of a look, if only for nostalgia.

.: AVAILABLE PLATFORMS
PC-DVD | Wii | PS 3 | PSP | XBOX 360 | DS

.: CONTACT Activision
.: ONLINE www.wolfenstein.com
.: PRICE $99.95

✔ Fun, tongue-in-cheek action-flick shooter; multiplayer.

✖ A tad on the generic side.

.: VERDICT ★★★½☆

chipchat

BY PETER DOCKRILL

Guess who's not coming to the meeting?

One of the things that always amuses Chip Chat is the way advertising so often presents such a self-consciously politically correct ethnic mix of folk using the product or service in question — almost like the old joke where one A, one B and one C walk into a bar... Well, in a seriously misguided attempt by Microsoft's marketers to tweak the formula, the company has been caught out altering the ethnicity of one of its overly-happy-suit-wearing-worker-bee-types (seriously, who actually looks like this in an office meeting?) for the Polish Microsoft site, replacing a black man with a white man. After the resultant furore, Microsoft withdrew the altered image and apologised for the digital mischief.

Back so soon?

We've seen the undead rise in the video clip to 'Thriller', but this is ridiculous! In an attempt to demonstrate the power of the internet to virally spread bogus information, German broadcaster RTL uploaded a hoax film to YouTube showing a supposed Michael Jackson, apparently not quite so dead after all, emerging from a 'coroner' van. Despite the intentionally dodgy quality of the footage, many online oglers were convinced they were witnessing the real deal — so RTL's theory might have something to it after all. Check out the vid for yourself at **www.youtube.com/watch?v=q0CO3qsQMTg**.

THRILLER NIGHT
Hordes of zombified end users glued to YouTube thought they'd caught onto the mother of all conspiracy theories...

Speed = bad = don't

OVER THE LIMIT?
US speeding awareness campaign talks to you with numbers you can understand. Ouch.

Sure, you're speeding — you're going *x* kilometres per hour over the speed limit, but what does that really mean, you know, in the real world? This clever road safety awareness campaign from Milwaukee, Wisconsin, measures your speeding and translates it into a figure you can (uncomfortably) relate to, like days in a hospital bed, or a percentage chance of a crash. Kind of makes our own 'little finger' campaign seem a little tame, no? (Although still pretty clever.)

Grunge may be dead; Cobain isn't

Speaking of digitally-back-from-the-dead music icons, it was with a decidedly post-ironic cringe that we heard the news that the new iteration of the Guitar Hero mega-super video game franchise would sport none other than grunge legend Kurt Cobain, playing along happily (if a little angstily) in avatar form to Nirvana's hit songs 'Smells Like Teen Spirit' and 'Lithium'. Now you too can emulate the suicidal frontman! Fifteen years after the man put a shotgun to his head, the corporate entertainment machine shows the true power of 'licensing' (and poor taste)... apc

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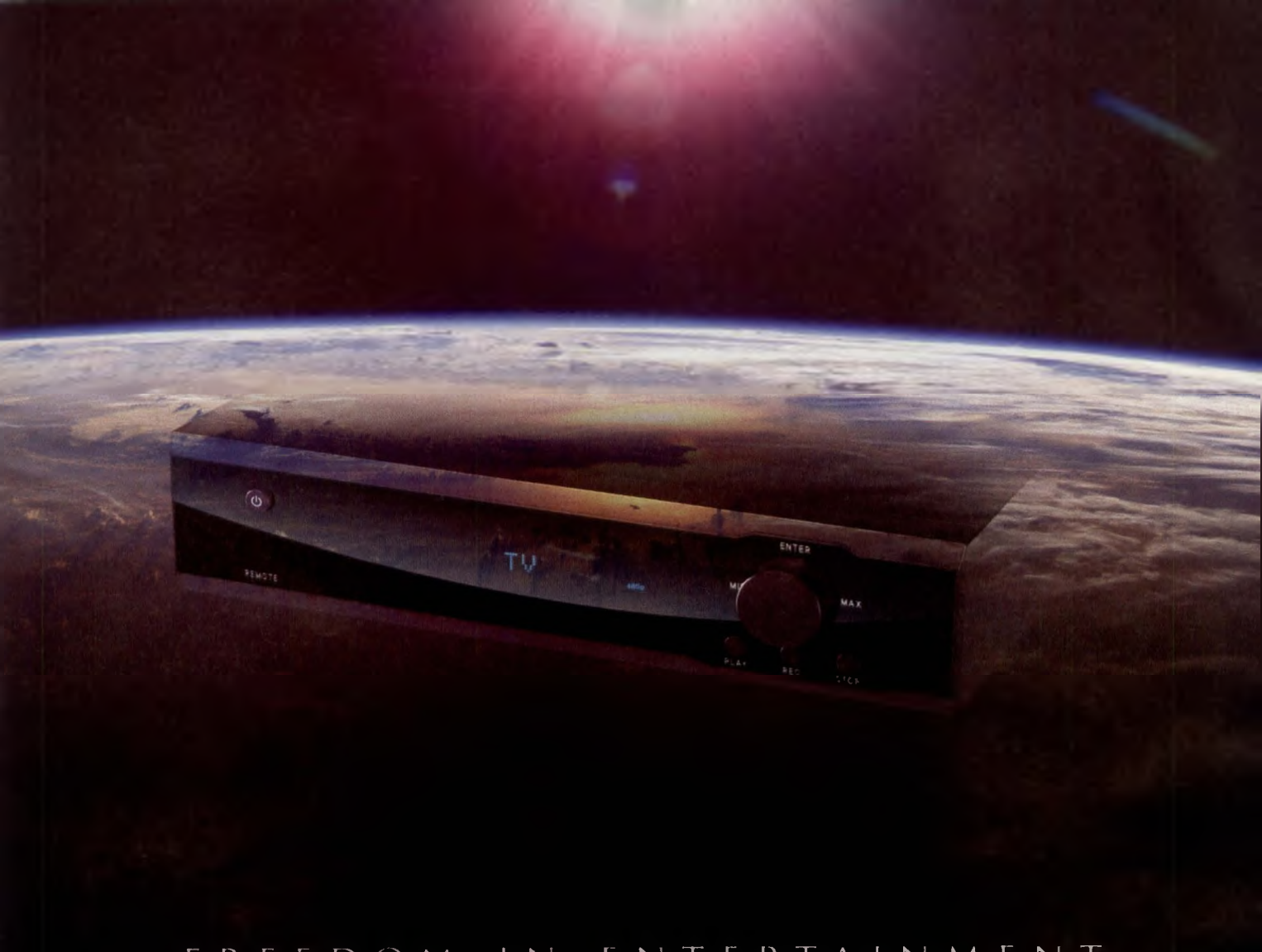

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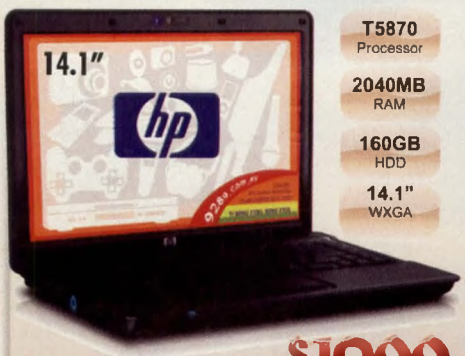

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Provides fully automatic fax reception, just like having a separate line. Two models are available.

INTELLIGENT FAXSWITCH

FAX SWITCH will allow your existing Fax Device to connect to a Single Telephone line or a Multi Line (PABX) phone system, to provide for FULLY AUTOMATIC Fax operation. Will operate with all existing telephones and also an Answering machine.

INTELLIGENT MODEMSWITCH

MODEM SWITCH allows your existing Data Modem Device to connect to any Single Telephone Line, Fax Line or a Multi Line (PABX) phone system, to provide for FULLY AUTOMATIC Dial In & Dial Out Modem Data operation. Models available that allow up to 8 devices on 1 line.

EFTPOS SWITCH

EFTPOS switch will allow your existing EFTPOS device to shar any existing Single Telephone Line, Fax Line or a Multi Line (PABX) phone system. Provides automatic connection on dialing. BARGE-IN protection prevents interference when line is in use. Alternative model wi allow operation on 2 lines.

MISCELLANEOUS TELEPHONE LINE APPLICATIONS

VOIP SELECTOR

This device will allow you to connect one or more telephones to your TELEPHONE LINE and VOIP LINE. Incoming calls from either line ring on the connected telephone(s). Outgoing calls are automatically DEFAULTED to ONE LINE but the alternative line can be selected by DTMF code.

TWO LINE SELECTOR

Premium device will allow you to connect one Telephone Device to two Telephone lines (Telstra, Optus, VOIP, PABX etc). Ideal for EFTPOS, Cordless Phones, Modems etc. Additional features are provided, including automatic (or manual) selection of an alternative line if the default line is busy.

TELEPHONE CALL TRANSFER

Easy-Transfer will allow you to answer a call on one telephone and then TRANSFER the call to another telephone fitted to the same line. Also provides INTERCOM facility. Uses your existing telephones.

MULTIPLE NUMBER SWITCH

Operate Two numbers on one line. This device will connec your Multiple number calls to one set of phones or answering machine and your Normal number calls to another set of phones or answering machine.

TELEPHONE LINE ON HOLD SOLUTIONS

DIGITAL ON HOLD

DMC, Australia's Leading On Hold player, is an MP3 based Message On Hold Device, designed to provide the High Quality and High Reliability that is necessary for all telephone On Hold applications. Easy message ... by replacing memory card.

ELECTRONIC MESSAGE UPDATE

DMS is available with range of optional Automatic electronic message update methods including Email, Modem, FTP and Network IP. We have a National Network of Dealers ready to produce your customized message.

SINGLE LINE ON HOLD

Just plug our MOH Line Sharer into any socket on your single telephone line, connect any audio source (Radio, PC or DMC), and you now have a professional telephone line On Hold facility for your existing telephones.

AUTOMATIC CALL ATTENDANT

Our single line CALL ATTENDANT will ... incoming calls after a preset number of rings, pla a greeting & then dial your call on hold until you are able to answer. Also provides Message on Hold facility for your single line.

MORE MISCELLANEOUS EQUIPMEN

TELEPHONE LINE SIMULATOR

This TELEPHONE LINE SIMULATOR can be used for testing, programming & demonstration of analogue telecommunications equipment, without the need to use a telephone line and generating costly calls. 4 Models are available.

RING INDICATOR

This device detects incoming calls and will close/open a relay to match the cadence of the incoming ring. Can also be set to close a relay until a call is answered. Ideal for control of external horns or lights to advise of an incoming telephone call.

REMOTE TELEPHONE ACTIVATOR

Call in to Switch ON, Switch OFF or RESET your PC, SERVER or any electrical device by telephone line using touch tone commands. RTA connects to any telephone line. Requires PCU accessory. 3 models are available.

POWER CONTROL UNIT

PCU connects direct to the RTA and also to your powe socket to allow telephone line dial in switching of the 240V supply connected to your equipment. Easy Plug In User Installation. Controls up to 10 Amps.

DIGITAL AUDIO EQUIPMENT

MESSAGE ON DEMAND

TDS can be programmed with up to 2GB MP3 based messages stored on an MMC/SD card, which can be recalled and played by keypad entry or time programmed sequences.

BACKGROUND MUSIC SYSTEM

High Quality BMS holds up to 8GB of MP3 Music/Messages on a SD Flash Card. Plays Messages at user set intervals. Powerful internal amp will allow direct connection of up to 8 speakers. Line Level output is also provided. Has encryption facility.

TALKING DISPLAY UNIT

TDU will play 1 or more pre-recorded messages as soon it is triggered by a movement sensor, a switch, or a preset time interval. Ideal for Product Promotions, Product Information, Message Warnings etc.

MULTIPLE INPUT UNIT

MIU will allow for up to 12 separate movement sensors ... switches to be connected to the TDU. Each sensor trigge its own unique message, output via any 8 ohm un-powered speaker or amplified speaker.

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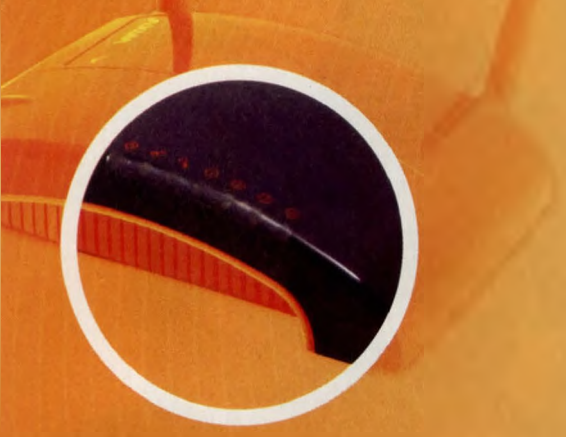

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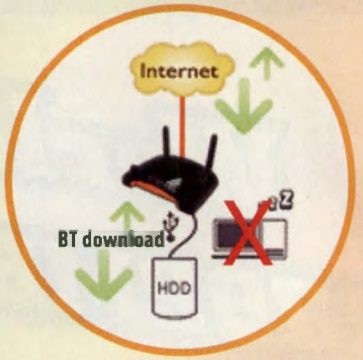

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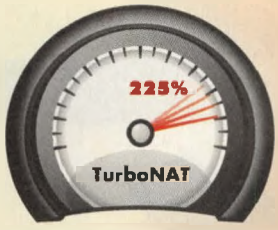
Session Manager

TurboNAT (Max. 95Mbps)



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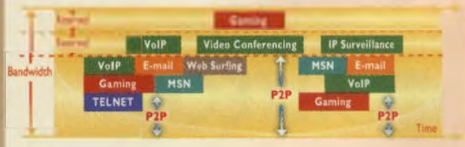

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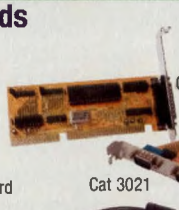
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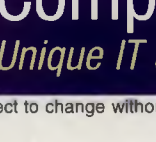
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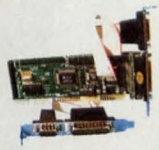
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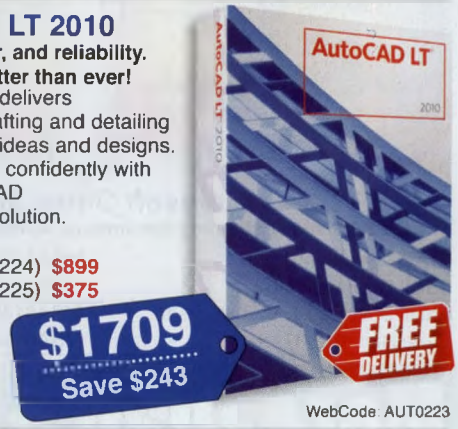

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Speed up documentation, share designs accurately, and explore ideas more intuitively in 3D. Getting that new design from paper to computer has never been easier. Proving to be the industry standard for model proto-types, to floor plans, and even more. AutoCAD provides the ultimate in power and flexibility, customisable for your specific needs.

WebCode: AUT0231

CorelDRAW Graphics Suite X4

New & improved Corel Graphics suite

CorelDRAW Graphics Suite X4 lets you tackle creative graphics and design projects with confidence.

WebCode: COR8968

Corel Painter 11

The most inventive digital painting software on the market

Corel Painter 11, software that delivers the most advanced photo painting and natural media tools available today.

WebCode: COR8712

Punch! Weekend Project

Your Ideas Made Easy

- Simple step-by-step instructions to complete any project.
- Over 100min of video tutorials
- Print out a bill of materials

WebCode: PUN0034

Punch! Home & Landscape Design Pro

Dream it. Visualize it. Do it!

- Over 100 hours of video tutorials
- Integrated web access for all your needs

WebCode: PUN0033

Microsoft Office Home & Student 2007

Great for families, excellent for students

Easily create great-looking documents, worksheets and presentations, as well as manage notes and information at home.

- Microsoft Excel
- Microsoft Powerpoint
- Microsoft Word
- Microsoft OneNote

$99.95
Save $50

WebCode: MSA6101

PRICE CHECKER

Harris Technology	$118
Officeworks	$127
Harvey Norman	$144
Dick Smith	$148

$184
Save $45

Microsoft Office 2008 Home & Student Edition - Mac

A must have for any Mac

Professional design is within your power with hundreds of new customisable templates and suite-wide themes, everything you need in the one office suite.

WebCode: MSA3770

Microsoft Office Suites

Create visually stunning documents, worksheets & presentations

Outlook Academic 2007	MSA6121	$84	SAVE $14
Small Business 2007	MSA6105	$458	SAVE $291
Small Business 2007 - Upgrade	MSA6106	$363	SAVE $86
Professional 2007	MSA6108	$715	SAVE $184

$469
Save $180

Microsoft Office 2008 - Mac

Simplify your day at work

Easy-to-use, powerful tools make it easy to create fantastic looking documents-from dynamic presentations to stunning reports and engaging communications.

WebCode: MSA3773

Windows 7

Includes NEW "XP Mode" to run all XP compatible Software

Register

To be one of the first to purchase Windows 7

Releasing October 22nd

Get your comprehensive rundown of all things Windows 7 @ citysoftware.com.au/windows7

More than 5 PC's ? Need new software?

Nuance Dragon NaturallySpeaking 10

Voice recognition, speech-to-text software, perfect for dictation

Standard	NUA0093	$139	SAVE $60
Preferred + FREE 1GB iPod	NUA0091	$259	SAVE $90
Preferred Wireless + Bluetooth Headset	NUA0105	$445	SAVE $154
Professional	NUA0097	$1198	SAVE $201

$59.95
Save $30

Nuance PDF Create 6

Create secure PDF files from any PC application

Create documents up to 3 times faster than with other PDF applications with results that are universally viewable from virtually any PDF viewer.

WebCode: NUA0128

$88
Save $141

Nuance PDF Converter Enterprise 6

Create, Convert, Edit and Share. Better PDF for Business

Everything your business needs to Create, Convert, and Edit PDF files.

WebCode: NUA0130

$239
Save $25

SmartDraw 2010

Create stunning artwork in Microsoft office with ease

Quickly create the business graphics you need to succeed, and is the perfect companion product to Microsoft Office.

WebCode: SMT2010

$149
Save $50

Nitro PDF Professional 5

The original and best acrobat alternative

Fast, high-quality document conversion. Do everything you do with paper electronically. Quickly edit and PDF any file with best-in-class manipulation tools.

WebCode: NIT0004

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Adobe Acrobat Pro	ALD9652	$597	SAVE $262
Acrobat Pro Extended	ALD9650	$969	SAVE $365

Microsoft Visual Studio

Microsoft Visual Studio 2008 Range

Professional development software

Visual Studio 2008 provides a full-featured development environment for Windows and Web developers. Offering productivity enhancements for building data-driven client and Web apps. Individual developers looking to create connected applications with next-gen user experiences will find Visual Studio 2008 a perfect fit.

Standard Upgrade	MSA9887	$284
Standard Full	MSA9888	$424
Professional Upgrade	MSA9890	$789
Professional Full	MSA9889	$1419
Professional Subscription w/MSDN	MSA9904	$1729

Delphi 2010 Professional

Fastest way to build Native Windows Applications

Delphi 2010 is the premier rapid application development environment for building high-performing applications. New features include Windows 7 API, Direct2D, and multi-touch support, Touch and gesturing for Windows 2000, XP, Vista, and Windows 7,IDE Insight instant access to any feature or setting, plus 120+ productivity enhancements and Debug visualisers.

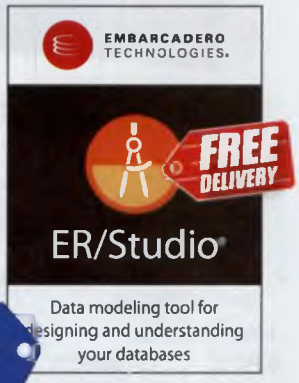
$1215

WebCode: EMB1000

ER/Studio Standard

Industry leading Data Modelling tool

ER/Studio provides an easy-to-use visual interface to document, understand, and publish information about existing databases. Reverse engineering of industry-leading database systems allow you to compare and consolidate common data structures without creating unnecessary duplication. Data modellers can create an information hub by importing, analysing, and repurposing metadata from all data sources.



$2099
Save $100

WebCode: EMB0002

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Crystal Reports 2008

Design interactive reports and connect them to virtually any data source

- Leverage professional reporting
- Empower end users to explore reports with on-report sorting and parameters
- Minimize IT and developer effort with interactive reports
- Save valuable report design time

$699
Save $82

WebCode: SCR2008

FileMaker Pro 10

Manage People, Projects, Assets, and More

Whether you need to manage client information, track project details, or produce inventory reports, FileMaker Pro 10 helps you get your important information organized in one place so it's instantly accessible.

- Status Toolbar – Put commonly used features at your fingertips with the redesigned interface
- Script Triggers - Create and run scripts prompted by user actions for increased productivity

$465
Save $34

WebCode: FIL2500

Xcelsius Engage 2008

Create engaging and interactive Dashboards

Xcelsius Engage gives you the power to transform complex data into a comprehensive dashboard.

- Interact with your data like never before with what-if scenarios and other visual components
- Connect to multiple live data sources to make real-time decisions

$1218
Save $113

WebCode: SCX2009

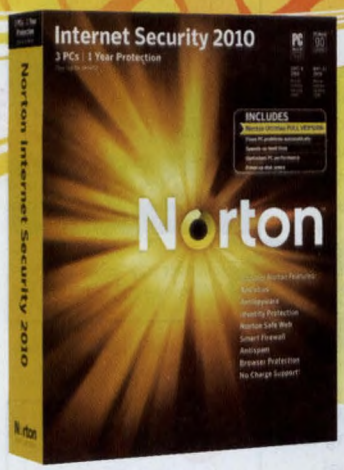
FileMaker Server 10

Server management simplified

FileMaker Server 10 is the fast, reliable, easy-to-manage database server software for groups of FileMaker Pro users that lets you securely share your databases over a network or on the web. Simply install FileMaker Server 10 on a dedicated computer and upload your FileMaker Pro solutions to the server. Installation and configuration takes just 20 minutes or less.

$1598
Save $34

WebCode: FIL2509



NEW
Norton Internet Security 2010
WITH
Norton Utilities

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Safer. Smarter. Faster.

The NEW Norton Internet Security, is the fastest Norton Security yet, with the ability to install in about a minute on the average machine.

- Minimal performance impact during gaming, video playback, presentations and more.
- Ultimate virus, worm, spyware, identity theft, phishing, and spam protection.

1 Year License

3 PC's	(SYM8850)	$79.95
5 PC's	(SYM8851)	$119
10 PC's	(SYM8851)	$198

AVG Internet Security
Comlete protection for everything you do

Anti-Virus, Anti-Spyware, Anti-Rootkit, Anti-Spam, Anti-Phishing, Enhanced Firewall, Web Shield, LinkScanner & Identity Protection.

- Safe banking and shopping
- Keeps your private information secure
- Ensures web pages you visit are safe
- Safe social networking, chatting & downloading
- High-speed. Won't slow you down.

1 User	(AVG0006)	$69
3 User	(AVG0009)	$78
5 Users	(AVG0007)	$145
10 Users	(AVG0008)	$255

1 Year Subscription

AVG Anti-Virus Network Edition
Centrally controlled Anti-Virus & Anti-Spyware protection for networks.

5 PC's	(AVG0011)	$199
10 PC's	(AVG0012)	$380
20 PC's	(AVG0013)	$660

Trend Micro Internet Security Pro 2010 - 3 User
Comprehensive internet security

- Anti-virus and Anti-spyware
- Email safety scans
- Online backup
- Identity advanced threat protection

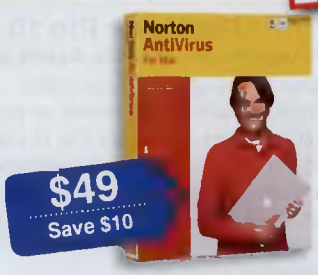
WebCode: TPK0200

• Viruses • Keystroke logging • Spyware • Identity Theft
How safe are you?

Norton Ghost 14.0
Backup and restore your entire PC with ease

Backup all of your data including: Applications, Settings, Folders and files.

WebCode: SYM9911



Norton AntiVirus 11.0
#1 AntiVirus Software for Mac

Remove viruses automatically, clean infected Internet and email downloads.

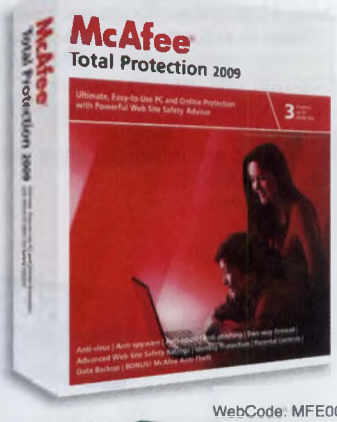
WebCode: SYM9799

McAfee Total Protection 2009 - 3 User
Easy-to-Use PC Protection with Powerful Web Site Safety Advisor

Now available with revolutionary Active Protection technology, offers you and your family the ultimate PC security with accelerated performance for online activities, personal files and home networking.

1 Year License

3 User	(MFE0008)	$99
6 User	(MFE0010)	$149



WebCode: MFE000

Net Nanny Home 6
Protect your family on the Internet from inappropriate content!

- Blocks pornography and protects families and children
- Remote management
- 3 User!

WebCode: MAN0170

Acronis True Image Home 2009
Backup and recovery that is EASY to perform!

- Easy rollback of system changes
- Smart Scheduling
- Password based encryption

WebCode: MAN0155

Kaspersky Internet Security 2010 - 3 User
New & Improved Version

- Improved advanced identity theft protection
- Special Gaming mode to suspend alerts while you play

WebCode: KAS0014

Kaspersky Small Office Security - 5 User
The latest in small office security

- Improved protection for shared file servers
- Maintain email & computer network availability
- 1 Year License

WebCode: KAS0013

MYOB Accounting Range

Built for Australians by Australians

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MYOB Accounting Plus 18	MYB0087	$474
MYOB Premier 12	MYB0089	$1264
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MYOB RetailReady

Point of sale Hardware & Software

MYOB RetailReady contains all the software and hardware you need to turn your PC into an effective Point of Sale (POS) solution. RetailReady processes sales fast, reports GST and performs "Cash Ups" in just a few clicks.

Includes:

- MYOB Retail Basics
- Barcode Scanner
- Thermal Docket Printer
- Electronic Cash Drawer

WebCode: MYB0040

MYOB Client Connect Plus

The better way to manage customers, contacts, proposals and sales opportunities

- Simple, easy to use Customer Relationship Management (CRM) program that operates within Microsoft Outlook
- Advanced reporting capabilities
- Sales automation
- Automated work flow activities
- 1 Year Subscription

WebCode: MYB0101

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+

FREE 12 months of upgrades & phone support included!

QuickBooks Accounting Range

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QuickBooks Pro 2009/10 + Bonus CRM	QUI0178	$709
QuickBooks Premier 2009/10 + Bonus CRM	QUI0179	$1159

Quicken Personal Plus 2009

Manage your investments

- Budgeting tools to help you save and plan for your future
- Monitor all of your personal and business investments

WebCode: QUI0169

MoneyWorks Express

Unique Accounting Software for Windows & MAC

- Perfect for Small and Medium sized businesses
- Cashbook & General Ledger
- AP, AR & Contact Management

WebCode: MON0013

Reckon Retail Starter Kit 2009/10

FREE 12 months of upgrades & support
FREE $100 Google Advertising

- QuickBooks Plus 09/10
- Retail Point of Sale Lite 09/10
- Includes: Receipt Printer, Cash Drawer, & Barcode Scanner

WebCode: QUI0189

ACT! by Sage 2010 v11

#1 Selling Contact Manager

Keep all your important relationship details for quick, organised access to the information you need.

Upgrade (ACT0051) **$149**

WebCode: ACT0050

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MSI Wind U100+ Netbook

Breeze through your work

Equipped with a high resolution webcam, high performance 2 channel stereo speakers,Wireless N, and microphone, all fitted perfectly within the framework design, expressing the slickness of technology and the elegance of modern fashion.

- Intel Atom N280 1.66GHz
- 1GB DDR2 RAM
- 160GB SATA HDD
- 6 Cell battery
- Wireless-N
- Windows XP Home

Windows xp

intel Atom

WebCode: Black - MSI0010
WebCode: White - MSI0011

Lenovo S10e IdeaPad

- Intel Atom N270 1.6GHz
- 1GB DDR2 RAM
- 160GB SATA HDD
- 6 Cell Battery
- Windows XP Home

WebCode: LNB9511

ASUS 1005HA Netbook

- Intel N280 1.66GHz
- 1GB DDR2 RAM
- 160GB SATA HDD
- Wireless N
- XP Home

WebCodes: White - ASE10023, Black - ASE10024

ASUS 1008HA Netbook

- Intel Atom N280 1.66GHz
- 1GB DDR2 RAM
- 160GB HDD + 10GB Eee Storage
- Up to 6 Hour Battery Life
- Windows XP Home

WebCode: ASUS0002

MSI Wind U123H Notebook

- Intel Atom N280 1.66GHz
- 1GB DDR2 RAM
- 160GB SATA HDD
- 3G Wireless Enabled
- Windows XP Home

WebCode: MSI0021

FREE DELIVERY NATIONWIDE

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MSI VR602 Home Notebook

- Intel Dual Core T1600 1.66GHz
- 2GB DDR2 RAM
- 160GB SATA HDD
- 1.3 Mega Pixel Webcam
- Windows Vista Home Basic

WebCode: MSI0020

MSI X320 Slim Notebook

- Intel Atom Z530 1.60GHz
- 2GB DDR2 RAM
- 320GB HDD
- 802.11b/g/n Wireless
- Windows Vista Home Premium

WebCode: MSI0015

Compaq Presario 610 Notebook

Go anywhere in style!

The new Compaq Presario 610 Notebook PC is designed for mobile users looking for a low-cost notebook with a 15.6 inch diagonal LED-backlit HD display, Intel processors and essential business features.

- Intel Core 2 Duo T5870 2.0GHz
- 4GB DDR2 RAM
- 320GB SATA HDD
- ATI Radeon HD4330 256MB Graphics
- Windows XP Pro with Vista Business Upg

WebCode: HCN1305

Lenovo G550 Notebook

- Intel Core 2 Duo T6500 2.1GHz
- 3GB DDR2 RAM
- 250GB SATA HDD
- Windows XP Pro
- Vista Business Upgrade included

WebCode: LEN0218

Lenovo SL500 Notebook

- Intel Core 2 Duo P7570 2.26GHz
- 2GB DDR2 RAM
- 250GB HDD
- nVidia 256MB GeForce Graphics
- Windows XP Professional

WebCode: LEN0228

NEW!

Acer eMachine EL1301 & 23" LCD Monitor

Superb Multimedia Performance

Extremely appealing with its compact classic small form factor design, black glossy getup with small platform of 8.5 Litre size ideal for desk space saving!

- AMD Athlon 2650e 1.6GHz
- 1GB DDR2 RAM
- 160GB SATA HDD
- DVD MultiBurner
- Windows XP Home

$599
After $59 Cashback

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Eaton Powerware 3105 700Va UPS

Never lose power to your devices again

- Protects small office and home office equipment from power outages, surges,sags, and line noise
- Saves space with a compact design that fits easily under a desk or can be conveniently wallmounted, with quick access to all receptacles

$109
Save $40

WebCode: PWR1003

HP ProLiant ML110G5 Server

The perfect server for the small business

The ProLiant Server series is renowned for it's reliabilty, performance, and functionality. Give your business the ProLiant edge it needs, with the server most businesses rely on everyday.

- Intel Pentium E2160 1.8GHz, 800MHz FSB
- 1GB DDR2 RAM, 8GB Max
- 2 x 160GB SATA HDD, 7200 RPM
- 6 Port SATA Controller with 4 bay RAID
- Microsoft SBS Standard Edition R2

LIMITED STOCK

$896
Save $1303

WebCode: HOS0419

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Acer X193HQ 19" Widescreen LCD

- 5ms Response Time
- 1366x768 Resolution
- 10,000:1 Constrast Ratio
- 300 cd/m2 Brightness

WebCode: ACM0148

$219
Save $130

BenQ E2200HD 22" Full HD Monitor

- 2ms Response Time
- 1920x1080 Resolution
- 1000:1 Constrast Ratio
- 300 cd/m2 Brightness

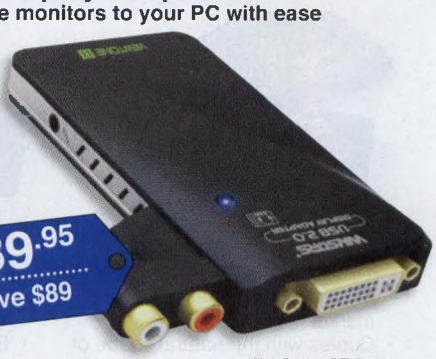
WebCode: BEN1322

USB Display Adapter

Connect a multiple monitors to your PC with ease

Add an extra monitor to your PC, via any USB 2.0 Port. Don't waste money on expensive video cards. Find the solution for half the price!

- VGA, DVI, HDMI, & RCA Audio
- 1600x1200 Resolution
- Type documents on one screen while viewing reference material on the other.



$89.95
Save $89

WebCode: OTH0412

Acer X243HQ 23.6" Widescreen Full HD Monitor

Perfect balance between performance and value in a full HD monitor

- 5ms Response time
- 1920x1080 Resolution
- 40000:1 Contrast ratio
- 300cs/m2 Brightness

$239
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Save $410

WebCode: ACM0146

$119

40" Portable Projector Screen

Can be easily carried on an aeroplane

- Perfect for on the go or impromptu presentations

50" Screen (MNT0003) $139

*Chad is not included

WebCode: MNT0002

$299
Save $300

Aiptek T20 Pocket Cinema Projector

Palm size portable projector

- 640x480 Resolution
- USB connection to your PC or Notebook
- Up to 42" Image size

WebCode: AIP0002

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Bamboo Pen (Small)	WAC6002	$97
Bamboo Pen & Touch (Small)	WAC6001	$144
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Logitech TrackMan Wheel
Smooth, ultra-precise tracking.
- Relieves wrist pain & aches.
- Ideal for animators, designers & the like!
- Mac & Vista Compatible

WebCode: LOG3762

Targus Notepac 200
Up to 16" Premium Notebook bag
- Elegant new design
- Plenty of compartments
- Padded shoulder strap

WebCode: TAR0001

Logitech MX 620 Mouse
Up to 1 Year Battery life!
- Advanced one-touch search button
- 5 Years Manufacturer Warranty
- Ergonomically Designed for comfort

WebCode: LOG3641

Targus Premium Wireless Laptop Mouse
Cable free computing!
- Wireless up to 15ft
- 3-Button Control.
- Sleek & Stylish
- Targus Laser technology

WebCode: TAR9939

Work is Simple with the right equipment

Logitech Cordless Wave Desktop
A must for the professional typist
- Most ergonomic design on the market
- Curves with the natural shape of your hands
- Vista and media quick launch keys

WebCode: LOG3655

Microsoft Lifecam Webcam VX-3000
Keep in touch – With style!
- 640x480 Video
- 1.3MP Photo Stills
- Built in Microphone

WebCode: MST8426

Olin Mobile Note Taker with Writing Recognition
Draw on any surface and save digitally!

Don't waste time looking for that lost paper, you never find. Jot down all your notes, drawings, and brainstorms on the go.The Olin Mobile Notetaker gives you the ability to do just that and transfer it all to your PC via USB.
- Save up to 100 A4 pages digitally.
- Handwriting recognition software included
- Doubles as a normal ink pen

Ink Refills 3 Pack (BUN0068) $9

WebCode: OLI0011

Microsoft Wireless Media Desktop 1000
Simple, yet versatile.

Sit back and enjoy fast, easy access to all your favourite digital pictures, music, videos, and more with this sleek, ultra-thin desktop keyboard & Mouse.

WebCode: MST8491

Logitech QuickCam Pro 9000
Crystal clear images and a stylish design
- Up to 8MP images via interpolation
- Automatic face tracking technology
- Skype compatible

WebCode: LOG3650

Targus Wireless Media Presenter
Presentations made easy!
- 2.4GHz @ up to 50ft
- Cursor control
- Built-in laser pointer
- True Plug-and-play

WebCode: TAR9942

Logitech 2.4GHz Cordless Presenter
Move around an auditorium with confidence

Effectively manage your time during presentations with a built-in programmable LCD timer.

WebCode: LOG3495

1TB Seagate HDD With ASTONE Enclosure

The External HDD that stands out from the crowd

- Stylish meshed metallic case provides best protection from overheating and reduces electro-magnetic interference
- External SATA (eSATA) enables up to 3G Bits/Sec data transfer rate

1.5TB (AST0024) **$199**
2TB (AST0022) **$299**

WebCode: AST0019

Verbatim 2TB RAID USB/eSATA Hard Drive

Nero BackItUp software Essentials included

- USB2.0 & eSATA Connectivity
- User selectable RAID BIG, 0/1 modes makes this ideal for any use

WebCode: VBM7528

Verbatim 250GB 2.5" Premium Edition Portable Hard Drive

Palm-sized and light weight

Store documents & Transfer data easily between home and office

WebCode: VBM9551

Seagate Portable 320GB USB Hard Drive

Store & exchange anywhere

- 5400 RPM performance
- USB powered
- Two year limited warranty

WebCode: SGA5001

Seagate 500GB Drive + Portable ASTONE Enclosure

Fully assembled to Plug & Play with built-in USB Cable

- Aluminium Alloy Mesh Case
- One Touch Backup feature
- Windows, Mac & Linux compatible

WebCode: AST0025

Seagate

2.5" Momentus Internal SATA Hard Drives

160GB (SGA8016) **$65**
250GB (SGA8017) **$71**
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500GB (SGA0507) **$122**

3.5" Barracuda Internal SATA Hard Drives

500GB (SGA0363) **$66**
1TB (SGA0367) **$109**
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2TB (SGA8020) **$279**

AStone External HD Drive Enclosures

2.5" USB2.0 (AST0021) **$19.95**

3.5" USB2.0 eSATA (BUN0071) **$29**

Knowledge = Wisdom

Storage is everything

Tower 7 Port USB 2.0 Hub

Vertical stand included

Running out of USB Ports? Plug this USB Hub into your PC or notebook to increase your connectivity.

WebCode: SIG0007

Lexar FireFly JumpDrive

Take data, photo, music, and video files wherever you go

2GB - Black	LXA7000	$13
4GB - White	LXA7001	$18
8GB - Charcoal	LXA7002	$31
16GB - Red	LXA7003	$56

SanDisk Cruzer Titanium USB

The Strongest USB Drive Around

4GB	SAN0086	$25
8GB	SAN0127	$38
16GB	SAN0175	$66

Kingston DT200 USB Key

Space, speed & security

The new DataTraveler 200 USB Flash drive is ideal for storing and transferring digital images, presentations and transporting all kinds of data. With capacities up to 128GB, the DT200 features Password Traveler software, which allows you to create and access a password-protected, secure area of the drive called a "Privacy Zone."

32GB	KIN0091	$98
64GB	KIN0092	$179
128GB	KIN0090	$479

Lexar Professional CompactFlash Card

Maximum 300x high speed UDMA performance and reliability

4GB	LXA7010	$58
8GB	LXA7011	$122
16GB	LXA7012	$209

SanDisk

Ultra II SD

4GB (SAN0098) **$18**
8GB (SAN0101) **$36**
16GB (SAN0151) **$68**

Ultra II Compact Flash (CF)

4GB (SAN0023) **$29**
8GB (SAN0037) **$48**

Memory Stick Pro Duo

4GB (SAN0053) **$26**
8GB (SAN0120) **$46**

Ultra II Memory Stick Pro Duo

4GB (SAN0066) **$35**
8GB (SAN0072) **$62**

Extreme III SD

4GB (SAN0125) **$27**
8GB (SAN0126) **$45**
16GB (SAN0179) **$157**

Extreme III Compact Flash

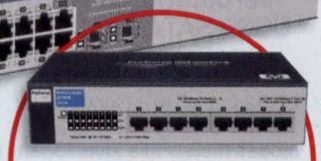
4GB (SAN0107) **$43**
8GB (SAN0108) **$76**
16GB (SAN0157) **$105**

All in one USB 2.0 Card Reader

WebCode: SIG0008

NEW!

$448
Save $147



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8 PORT 1810G Switch
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Plug-and-Play Gigabit Network connectivity

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- Fanless switches for silent operation
- Two dual-personality mini-GBIC slots (24 Port model)
- Power over Ethernet device option (8 port model)
- Automatic low power mode
- Secure Sockets Layer (SSL)
- Included Kensington Lock for theft protection

ProCurve Lifetime Warranty

WebCode: HPE00001

Billion BiPAC 7404VNPX ADSL2+ Firewall Router
The router that has it all - VOIP, 3G, ADSL2+, Wireless-N

- Dual WAN interfaces for ADSL2+ and 3G connections
- High speed Internet access with ADSL2 / 2+; backward compatible with ADSL
- 802.11n Wireless AP
- High-speed wireless connection up to 300Mbps data rate
- Auto fail-over feature to ensure an always-on connection
- Voice over IP compliant with standard phone system

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$319
Save $160

FREE DELIVERY

WebCode: BIL0040

$227
Save $222

Billion BiPAC 7800N ADSL2+ Firewall Router + Gigabit Ethernet Switch
Recommended for the enthusiasts

- Draft-N Wireless
- 4-Port Gigabit Switch
- Robust Firewall Built-In

WebCode: BIL0041

$193
Save $106+

Billion BiPAC 7404VGPX VOIP/3G/ADSL2+ Firewall Router
The All-in-one ADSL2+ solution

- Create your own mobile hotspot for Wi-Fi access
- 802.11g Wireless

WebCode: BIL0045

Don't get caught with your.... CONNECTION DOWN!

FREE DELIVERY

$198
Save $101

D-Link DIR-655 Xtreme N Gigabit Router
Make the move to Wireless-N

Connect the Xtreme N Gigabit Router to a cable or DSL modem and provide high-speed Internet access to multiple computers.

WebCode: DLK0064

NEW!

$206
Save $93

NETGEAR Wndr3700 Dual Band N Gigabit Router
The power you want and flexibility you need for your network

- Gigabit Ethernet ports deliver ultra-fast wired connections
- 3 power and range settings reduce power up to 75%

WebCode: NTG8346

$107
Save $62

NETGEAR GS608 8 Port Gigabit Switch
Move files across your network fast!

- Fast Ethernet for up to eight computers
- Fanless design for quiet operation
- Plug and Play installation

WebCode: NTG7186

$88
Save $40

Linksys WRT54GL Linux-based Wireless-G Router
Designed specifically for hobbyists and wireless aficionados

- Eliminate the need for cables
- Compatible with Wireless-B
- Browser-based configuration utility

WebCode: LNK5525

$99
Save $60

NetComm NB6PLUS4W ADSL2+ Wireless Router
Watch movies, download music online, wirelessly

- 4-port switch
- WEP, WPA and WPA2 wireless encryption

WebCode: NET9510

$118
Save $81

NetComm NP3680 Multifunction USB Server
Connect USB Storage or a Printer to your network

- 2 USB Ports
- Mac & Windows Supported
- Ethernet 10/100

WebCode: NTG9483

NEW!

$219
Save $180

Iomega 1TB Home Media Network Hard Disk
Easily your data between your PC's

- Gigabit Ethernet
- iTunes server & UPnP Media Server
- 7200RPM SATA HDD Built in

WebCode: IOM6929

$549

QNAP TS-219P 2-Bay NAS Server
Supports 2.5" & 3.5" SATA HDD's

- iSCSI Support
- RAID 0, 1, JBOD systems
- Gigabit Ethernet

WebCode: QNA0028

Fuji Xerox PE220 WorkCentre A4 Mono MFP

Budget multifunction printer

- 20ppm Mono
- 600 x 600 DPI printing
- Fax / Copier / Printer / Scanner
- USB 2.0, Parallel

WebCode: FXP1220

3K Black	FXP0683	$121

Samsung SCX-4828FN Mono Multifunction

Ideal for all your business needs

- Print, Scan, Copy, Fax
- 28ppm Mono
- Built-in Duplexer
- USB 2.0, Ethernet

SCX-4824FN (SAM4824)
$290 After $50 Cashback

WebCode: SAM4828

5K Black	SAM6572	$163

Samsung ML-2851ND Mono Laser

Mono network printer with duplex

- Up to 28ppm mono
- Duplex printing
- USB 2.0, Ethernet
- 2 year onsite warranty

WebCode: SAM2851

5K Black	SAM6359	$182

Canon PIXMA iP4600 Inkjet Printer

Vibrant photos & documents at home

- Up to 21ppm Colour
- 9600x2400 DPI
- CD & DVD Printing
- USB 2.0

WebCode: CNN0009

Black	CAN7000	$18
Cyan	CAN7003	$18
Magenta	CAN7002	$18
Yellow	CAN7001	$18

Samsung CLP-610ND Colour Laser

Efficient and sharp detail

- 20ppm Colour
- Built-in Duplexer
- USB 2.0, Ethernet
- Low running costs
- 1 Year on-site warranty

WebCode: SAM0610

5K Black	SAM6361	$148	5K Magenta	SAM6363	$195
5K Cyan	SAM6362	$195	5K Yellow	SAM6364	$195

Fuji Xerox DocuPrint C2200 Colour Laser

Handle Complex documents with ease

- 25ppm Mono & Colour
- 600x600 dpi
- 256MB RAM
- USB 2.0, Ethernet

WebCode: FXP2201

4K Black	FXP2208	$234
4K Cyan	FXP2209	$239
4K Magenta	FXP2210	$239
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- USB, Infrared

WebCode: CAN0732

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Colour CLI-36	CAN8105	$27

Fuji Xerox DocuPrint C1190 Colour Multifunction

Print / Copy / Scan / Fax

- Resolution 600 x 600 DPI
- 12ppm Colour / 16ppm Mono
- PC & MAC Compatible
- USB 2.0, Ethernet

WebCode: FXP1190

3K Black	FXP1193	$116
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3K Magenta	FXP1195	$200
3K Yellow	FXP1196	$200

Samsung CLX-6210FX Colour Multifunction

Best value colour multifunction!

- 20 ppm Colour & Mono
- Duplex / Copy / Scan / Print / Fax
- USB 2.0, Ethernet
- 1 Year onsite warranty

WebCode: SAM6210

5K Black	SAM6361	$148
5K Cyan	SAM6362	$195
5K Magenta	SAM6363	$195
5K Yellow	SAM6364	$195

Fuji Xerox DocuPrint C3055DX A3 Colour

Worlds smallest A3 colour laser

- 35ppm Mono & 8ppm Colour
- 600 x 600 DPI
- USB 2.0, Ethernet
- PCL5E, Postscript 3, PCL 6, PDF

WebCode: FXP3055

6.5K Black	FXP3063	$90
6.5K Cyan	FXP3064	$156
6.5K Magenta	FXP3065	$156
6.5K Yellow	FXP3066	$156

Canon PIXMA MP980 All-in-One Inkjet Printer

Network-Ready multifunction inkjet

- 9600x2400 dpi printing
- Wireless / Wired LAN
- 3.5" colour TFT screen

WebCode: CNN0980

Black	CAN7000	$18
Grey	CAN7004	$18
Photo Black	CAN7005	$27
Cyan	CAN7003	$18
Magenta	CAN7002	$18
Yellow	CAN7001	$18

Kaiser Baas PhotoMaker Digital Slide Scanner

Convert 35mm Slides & Negatives to Digital Photos

- Capture directly to PC with the touch of a button
- Software to edit, enhance, email, print, and burn your photos to DVD.
- Includes slide and negative holders.
- XP & Vista compatible

WebCode: KAB0025

Canon IXUS 80 IS Digital Still Camera

Capture memories with ease

- 8 Megapixel
- 3x Optical Zoom
- 2.5" LCD Screen

WebCode: CAN0695

Canon Legra FS200 Digital Video Camera

Professional SD Card Video Camera

- 800k Sensor
- 3 Hour Recording on 16GB SD
- 41x Optical Zoom
- 2.7" LCD Screen

WebCode: CNN0050

Kodak ZX1 Digital Video Camera

Small enough to fit in your pocket!

- Record 720p HD Video @ 60fps
- Rain, snow, sand, dirt resistant
- Powered by 2 x AA Batteries
- Dimensions 50×107×20 mm

WebCode: KOD7861

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Perfect for your digital camera

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Make memories last a lifetime

Canon CanoScan Lide 700F Scanner

Slimline document and photo scanner

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- Single frame slide scanning
- One cable setup

WebCode: CNN0038

Canon CanoScan 8800F Scanner

High speed document / Photo Slide scanner

- 4800x9600 dpi
- Continuous scanning of up to 12 slides
- Scan to PDF

WebCode: CAN5015

AVLabs Digital Photo Frames

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WebCode: ELE0011

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WebCode: BUN0036

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WebCode: CAR0010

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WebCode: PWR1002

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- Stream from any USB devices

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- Supports MP3, WMA, WAV, OGG, AAC, LPCM, FLAC, AC3, DTS and DTS-HD Audio formats
- Support USB host and Samba Server
- Reads FAT32 and NTFS

WebCode: NOO0001

Logitech Harmony 785 Universal Remote

Control your Home Entertainment system

- Teletext control
- Easy setup
- Fully backlit keypad

WebCode: LOG3596

DViCO TViX M-6500A PVR Media Center - Dual Tuner

Stream and transfer multimedia files to your HDTV via LAN

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- USB Host for Camera, Flash Drive & External Hard Disks

M-6500A Dual Tuner + 1TB HDD
(DVC0050) $748

WebCode: DVC0048

OLIN DVD Player JMK-3802

The DVD Player under $50 with USB input

WebCode: WST0002

Hailo HDSTB-8000 High Definition Set Top Box

Low Cost Digital TV in High Definition!

WebCode: HAI0001

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WebCode: AVL1022

Pinnacle Dazzle Video to DVD Recorder

Transfer video footage to DVD!

The Dazzle USB Box connects easily to a VCR, DVD player, camcorder or almost any other video device.

WebCode: PIN0189

AVLabs USB HD Digital TV Tuner

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WebCode: AVL1013

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WebCode: LAK0014

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WebCode: SAS0100

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WebCode: AVL1016

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- 2 Mega Pixel Camera

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